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CONTRACT SOURCE SELECTION: AN ANALYSIS OF LOWEST PRICE TECHNICALLY ACCEPTABLE AND TRADEOFF STRATEGIES

June 2016

**By: David W. Hill,
David F. Odom,
Jamal M. Osman, and
Wesley J. Paulk**

**Advisors: Rene G. Rendon
Karen Landale**

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TECHNICALLY ACCEPTABLE AND TRADEOFF STRATEGIES**

David W. Hill, Lieutenant, United States Navy
David F. Odom, Lieutenant, United States Navy
Jamal M. Osman, Lieutenant Commander, United States Navy
Wesley J. Paulk, Lieutenant, United States Navy

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Approved by: Rene G. Rendon, Lead Advisor

Karen Landale, Co-Advisor

Rene G. Rendon
Academic Associate
Graduate School of Business and Public Policy

Don Summers
Academic Associate
Graduate School of Business and Public Policy

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ABSTRACT

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LIST OF ACRONYMS AND ABBREVIATIONS

ASN	Assistant Secretary of the Navy
BBP	Better Buying Power
C4I	Command, Control, Communications, Computers and Intelligence
CICA	Competition in Contracting Act
COTR	Contracting Officer's Technical Representatives
CPAF	Cost-Plus Award Fee
CPARS	Contractor Performance Assessment Reporting System
CPFF	Cost-Plus Fixed Fee
CPIF	Cost-Plus Incentive Fee
DASN	Deputy Assistant Secretaries of the Navy
DAU	Defense Acquisition University
DFARS	Defense Federal Acquisition Regulation Supplement
DOD	Department of Defense
DODIG	Department of Defense Inspector General
DV	Dependent Variable
EVM	Earned Value Management
FAR	Federal Acquisition Regulation
FASA	Federal Acquisition Streamlining Act
FFP	Firm Fixed Priced
FPIF	Fixed-Plus Incentive Firm
GAO	Government Accountability Office
GPE	Government-Wide Point of Entry
IFB	Invitation for Bid
IMF	Intermediate Maintenance Facility
IT	Information Technology
IV	Independent Variable
LPTA	Lowest Price Technically Acceptable
NAVSUP	Naval Supply Systems Command
NMCARS	Navy/Marine Corps Acquisition Regulation Supplement

NUMCLINS	Number of Contract Line Item Numbers
NUMEVALFACTORS	Number of Evaluation Factors
NUMOFFERS	Number of Offers
NUMREVIEWS	Number of Reviews
OUSD[AT&L]	Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics
PALT	Procurement Administrative Lead Time
PBL	Performance Based Logistics
PEO	Program Executive Officers
RDA	Research, Development, and Acquisition
RDT&E	Research, Development, Test, and Evaluation
RFI	Request for Quotation
RFP	Request for Proposal
RFQ	Request for Information
SBA	Small Business Act
SECNAV	Secretary of the Navy
SOW	Statement of Work
SPAWAR	Space and Naval Warfare Systems Command
SPAWAR HQ	Space and Naval Warfare Systems Command Headquarters
SSC PAC	SPAWAR Systems Center Pacific
SSFA	SPAWAR Space Field Activity
SYSCOM	System Commands
TINA	Truth in Negotiations Act
USD (AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics
VALUE	Value of Contract in Dollars

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—Dave Odom

I would like to dedicate this project to my lovely and supportive wife, Heidi, and my children, Yasmine and Elijah. Thank you for all your love, support, and patience during these past 18 months.

—Jamal Osman

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I. INTRODUCTION

The Department of Defense (DOD) expects to invest \$1.5 trillion in defense acquisition programs (GAO, 2015). This does not include the multitude of other acquisitions that the federal government procures on a yearly basis. In the current budgetary environment, it has become increasingly important to make best use of scarce funding and obtain the best value for every good or service. The method to steer the acquisition workforce into properly buying goods and services is the contract management process. Rendon and Snider state, “the contract-management process is typically used as the vehicle for progressing through the defense acquisition life cycle” (Rendon & Snider, 2008, p. 165). The six contract management process steps are “procurement planning, solicitation planning, solicitation, source selection, contract administration, and contract closeout” (Rendon & Snider, 2008, p. 165).

The source selection step of the contract management process is vital to executing the appropriate contracting award strategy to deliver the best value to the government. In order to achieve best value for all stakeholders, government contracting officers have two primary source selection strategies at their disposal: lowest price technically acceptable (LPTA) and tradeoff. The LPTA source selection strategy is “appropriate when best value is expected to result from selection of the technically acceptable proposal with the lowest evaluated price” (FAR, 2016, 15.101-2(a)). The FAR also explains that tradeoff “is appropriate when it may be in the best interest of the Government to consider award to other than the lowest priced offeror or other than the highest technically rated offeror” (FAR, 2016, 15-101-1(a)). The tradeoff strategy incorporates factors besides cost or price in determining if the good or service best meets the need of the government. Examples of these factors include past performance, technical ability, and sub-contractor management—any factor that is unrelated to cost or price.

A. PURPOSE

This research analyzes LPTA and tradeoff source selection strategies and contract outcomes to determine if a relationship exists. Earned value management (EVM) metrics (when available), Contractor Performance Assessment Reporting System (CPARS) ratings, and procurement administrative lead-time (PALT) are examples of contract outcomes that the research team will analyze. This research is part of an ongoing research stream guided by Dr. Rene Rendon and Major Karen Landale of the Graduate School of Business and Public Policy at the Naval Postgraduate School. Our research incorporates new data extracted from a large sample of contracts and associated files at the Space and Naval Warfare Systems Command (SPAWAR) and Naval Supply Systems Command (NAVSUP).

B. RESEARCH QUESTIONS

The following questions will be addressed in our research:

1. Are pre-award contract elements affected by source selection strategy? Pre-award elements include amendments to solicitation, how long it takes to award the contract (PALT), contract type, and whether there was a protest.
2. Are post-award contract elements affected by source selection strategy? Post-award elements include CPARS ratings, and, if applicable, EVM metrics.
3. Are there any patterns or trends based on federal supply codes when LPTA or tradeoff is used as a source selection strategy at different systems commands?

C. METHODOLOGY

The methodology for this research consists of a review of applicable literature and a post-collection data analysis. The research team reviewed completed contract files and other contract-related documents from the Space and Naval Warfare Systems Command (SPAWAR) and the Naval Supply System Command (NAVSUP). The team attempted to gather an equal mix of LPTA and tradeoff contract files to increase the ongoing research sample size. The research team examined each of the LPTA and tradeoff contract files and gathered the required data elements reflected in the Appendix. Statistical analysis,

including analysis of covariance (ANCOVA), was used to identify possible relationships between source selection strategy and contract outcomes.

D. RESEARCH BENEFITS

This research will help government contracting agencies identify the proper source selection strategy that is most advantageous to the government. The government contracting agency will better analyze the pre and post-award contract elements and have the knowledge to decide the best contracting source selection strategy for a best value contract outcome. The contracting agency will understand when the tradeoff source selection strategy is worth the added cost for the respective requirement. Finally, this research taps into two major system commands not previously used in this ongoing research stream. It will help decide if the joint data in the ongoing research have any trends and if these trends can be applied for best practice government contracting agency use.

E. RESEARCH LIMITATIONS

Our main constraint was having enough time to gather sufficient data to incorporate into the ongoing research stream. Due to time constraints, we only had five business days to gather the contract data elements between two SPAWAR activities and one NAVSUP activity. The research team's goal was to view 50 separate contract files and populate the table in the Appendix with the required data elements.

We reviewed 76 contract files, but we could only extract all required data from 50 of them. Twenty-six of the contract files were retrieved from an electronic database and did not include all data elements for our research. The research team did not have access to the electronic repository of contract files and had to rely on site support for the required information. This proved to be a lengthy process, and given the time considerations, the research team could not gather the required complete information.

Another challenge we encountered was achieving an acceptable learning curve for data extraction at each site location. Although the hard copy contract files at each location were similar, the organization of the contract files between locations differed

slightly. Once we became proficient at data collection within one location, the research team had limited time before moving on to the next location.

The final challenge was gathering the required data elements for the contract files based on the individual site location. For example, NAVSUP only had limited contracts containing CPARS information. However, SPAWAR had all required CPARS information, but due to the electronic filing system, it was difficult to find other required data elements to fully populate the table of data elements.

F. REPORT ORGANIZATION

The organization of this report is subsequently described. In Chapter I, the introduction comprises the research's purpose, the research questions, the methodology, and the benefits and research limitations. Chapter II comprises a review of applicable literature of the government contract management process, the LPTA and tradeoff source selection strategies, and the current debate of the appropriate use of LPTA and tradeoff strategies. Chapter III entails an overview of the SPAWAR and NAVSUP organizations. Chapter IV submits the data analysis results from SPAWAR and NAVSUP and provides implications for DOD contract management. Chapter V summarizes and concludes the report with answers to the research questions and recommended areas for continued research.

G. SUMMARY

Chapter I provided the research purpose, questions for the research, the methodology, benefits and limitations, and report organization. Chapter II will look at the applicable literature related to the government contract management process, LPTA and tradeoff source selection strategies, and the current debate on the applicable use of LPTA and tradeoff source selection strategies.

II. LITERATURE REVIEW

The focus of the literature review is to garner a thorough understanding of applicable contract management statutes and regulations. Additionally, the contract management process (including the three phases and six steps) as described by Garrett, and the two primary source selection strategies (LPTA and tradeoff) as described in the FAR are discussed. Lastly, the literature review will address the current debate with respect to the proper use of LPTA and tradeoff source selection strategies.

A. CONTRACT MANAGEMENT STATUTES AND REGULATIONS

In the contract management process, a contract, as defined by the FAR 2.101(b) states that it is

A mutually binding legal relationship obligating the seller to furnish the supplies or services (including construction) and the buyer to pay for them. It includes all types of commitments that obligate the Government to an expenditure of appropriated funds and that, except as otherwise authorized, are in writing. In addition to bilateral instruments, contracts include (but are not limited to) awards and notices of awards; job orders or task letters issued under basic ordering agreements; letter contracts; orders, such as purchase orders, under which the contract becomes effective by written acceptance or performance; and bilateral contract modifications. Contracts do not include grants and cooperative agreements covered by 31 U.S.C.6301, et seq.

As a more practical definition, Garrett defines a contract as “a relationship between two parties, such as a buyer and seller, that is defined by an agreement about their respective rights and responsibilities” (Garrett, 2010, p. 416).

The following laws and regulation govern the contract management process:

- Small Business Act of 1953 (SBA)
- Truthful Cost or Pricing Data Act (41 U.S.C. 35)
- Competition in Contracting Act of 1984 (CICA)
- Federal Acquisition Streamlining Act of 1994 (FASA)
- Federal Acquisition Reform Act of 1996 (FARA)
- Federal Acquisition Regulation (FAR)

1. SBA of 1953

Due to concerns over a shrinking industrial base and a lack of small business representation in government acquisition, Congress passed the SBA of 1953 mandating the government

aid, counsel, assist, and protect, insofar as is possible, the interests of small-business concerns in order to preserve free competitive enterprise, to insure that a fair proportion of the total purchased and contracts or subcontracts for property and services for the Government (including but not limited to contracts or subcontracts for maintenance, repair, and construction) be placed with small business enterprises, to insure that a fair proportion of the total sales of Government property be made to such enterprises, and to maintain and strengthen the overall economy of the Nation.

The SBA of 1953 defines a small business as “one which is independently owned and operated and which is not dominant in its field of operation” (Small Business Act, 1953).

2. Truthful Cost or Pricing Data Act

Once referred to as the Truth in Negotiations Act (TINA), TINA has been renamed the Truthful Cost or Pricing Data Act (FAR, 1.110). The Procedures, Guidance, and Information addendum to the Defense Federal Acquisition Regulation Supplement states that

(1) Contracting officers must purchase supplies and services from responsible sources at fair and reasonable prices. The Truth in Negotiations Act (TINA) (10 U.S.C. 2306a and 41 U.S.C. chapter 35) requires offerors to submit certified cost or pricing data if a procurement exceeds the TINA threshold and none of the exceptions to certified cost or pricing data requirements applies. Under TINA, the contracting officer obtains accurate, complete, and current data from offerors to establish a fair and reasonable price (see FAR 15.403). TINA also allows for a price adjustment remedy if it is later found that a contractor did not provide accurate, complete, and current data.

(2) When certified cost or pricing data are not required, and the contracting officer does not have sufficient data to determine price reasonableness, FAR 15.402(a)(2) requires the offeror to provide whatever

data the contracting officer needs in order to determine fair and reasonable prices.

(3) Obtaining sufficient data from the offeror is particularly critical in situations where an item is determined to be a commercial item in accordance with FAR 2.101 and the contract is being awarded on a sole source basis. This includes commercial sales data of items sold in similar quantities and, if such data is insufficient, cost data to support the proposed price.

3. CICA of 1984

CICA of 1984 mandates the maximization of full and open competition, whenever feasible, for awarding contracts (Nash, Schooner, Obrien-DeBakey, & Edwards, 2007, p. 111). The contracting officer is required “to execute a justification—and obtain approval of it—for any procurement in which full and open completion would not be obtained” (Nash et al., 2007, p. 111). Contracting officers may bypass competition and award sole-source in the following situations:

- “Only one responsible source and no other supplies or services will satisfy agency requirements” (FAR 6.302–1)
- “Unusual and compelling urgency” (FAR 6.302–2)
- “Industrial mobilization; engineering, developmental, or research capability; or expert services” (FAR 6.302–3)
- “International agreement” (FAR 6.302–4)
- “Authorized or required by statute” (FAR 6.302–5)
- “National security” (FAR 6.302–6)
- “Public interest” (FAR 6.302–7)

4. FASA and FARA

In recognition of the innovations generated in private industry best practices, Congress enacted FASA to urge the federal government to operate more in line with the commercial marketplace and to buy commercial items whenever feasible (OUSD[AT&L], 2011, p. iv). As a mechanism to facilitate this, the FASA raised the threshold for simplified acquisition procedures to \$100,000 (Nash et al., 2007, p. 254), which was subsequently raised again to \$150,000 (FAR 2.101). The Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics (OUSD[AT&L]) requires that “all of acquisition must move to a price-based, market-driven environment from requirements development through properly disposal. Source selection must be

made on a ‘best value’ not ‘cheapest price’ basis” (OUSD[AT&L], 2011, p. iv). In addition, FASA made market research and past performance monitoring and documentation a statutory requirement and created an allowance for best value. The FARA additions are detailed in Figure 1.

- Expanded definition of “commercial item” and its applicability to include:
 - items which have evolved from commercial items
 - items that are commercial with modifications to meet Government unique requirements
 - combinations of commercial items and services for Government use
 - non-developmental items (NDI – items originally developed and/or sourced by a Government agency)
 - services at catalog or market prices
- Prohibited the use of certified cost and pricing data under TINA for commercial items.
- Allows the utilization of Simplified Acquisition Procedures (SAP) up to \$5 million for commercial goods and services.

Figure 1. FARA Additions to FASA. Source: Yoder (2007).

The OUSD[AT&L] Commercial Item Handbook (Vers. 2.0) states that “the 1996 Federal Acquisition Reform Act continued the intent of FASA, creating opportunities to improve procedures, promote completion, and purchase commercial items with the ease of non-governmental agencies” (OUSD[AT&L], 2011, p. iv).

5. FAR

The FAR regulates how the federal government acquires supplies and services; the set of rules “is prepared, issued, and maintained, and the FAR System is prescribed jointly by the Secretary of Defense, the Administrator of General Services, and the Administrator, National Aeronautics and Space Administration, under their several statutory authorities” (FAR 1.103b). Many federal agencies and departments maintain their own supplements to the FAR including:

- Defense Federal Acquisition Regulation Supplement (DFARS)
- Navy and Marine Corps Acquisition Supplement (NMCARS)

- Army Federal Acquisitions Regulation Supplement (AFARS)
- Air Force Federal Acquisition Regulation Supplement (AFFARS)
- Homeland Security Acquisition Regulation (HSAR)

Thus far, the management of government contracts through statutes and regulations has been the focus. The contract management process will be discussed in the following section.

B. CONTRACT MANAGEMENT PROCESS

This section examines the contract management process in terms of the three phases and six steps that make up the process. There are two vantage points from which to view contracts: the seller and the buyer. The seller provides services or finished goods, such as weapons systems, for payment. When dealing with a DOD acquisition, the seller is most often a defense contractor. The buyer, who is the government, in this case, purchases these goods and services using contracts. Because contracts can be complex in nature, contract management is often viewed as “the art and science of managing a contractual agreement throughout the contracting process” (Garrett, 2010, p. 18). Contractors often fulfill requirements in support of key operations because the DOD is not adequately manned to provide all required products and services in-house. Contracts are created, as the principal means to make sure that the government and contractor understand their individual responsibilities within the agreement. These documents make the agreement between buyer and seller legally binding, thereby reducing any uncertainty or risk that the two parties will fail to meet their obligations as set forth in the contract. However, successful contract outcomes require an ethical business relationship between the government and contractor(s) in addition to strict adherence to contract requirements.

Next, we turn to the three phases, and the six steps contained within those phases, of the contract management process, as detailed by Garrett (2010). Both the buyer and the seller conduct six steps as part of the contract management process. However, the six steps are not the same between the two parties. This research focuses on the buyer’s steps. Figure 2 depicts the contract management process.

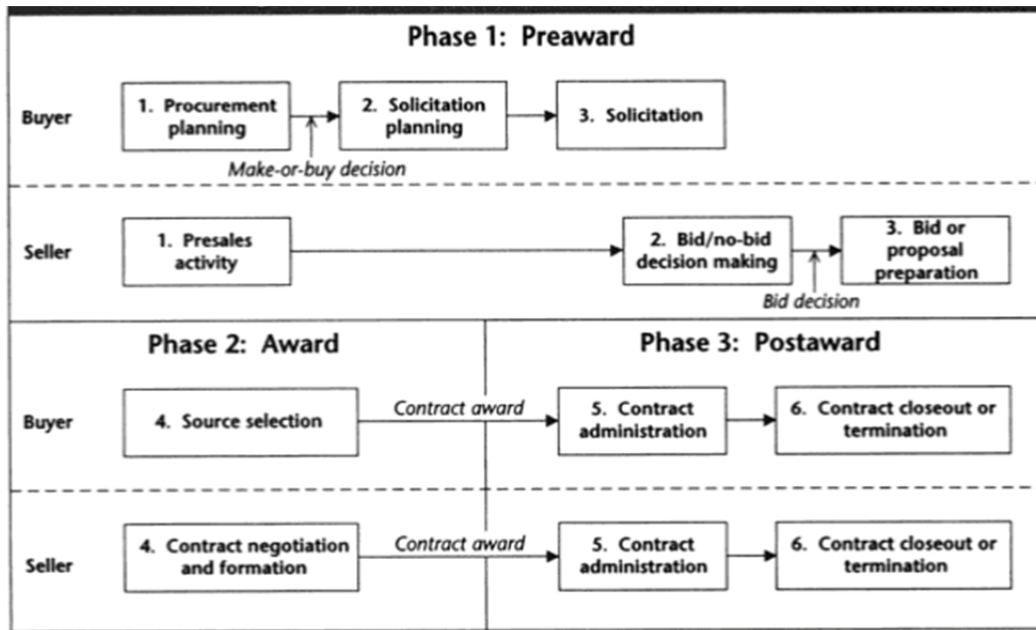


Figure 2. The Three-Phase Contract Management Process.
Source: Garrett (2010).

1. Pre-award Phase

The pre-award phase of the contract management process includes procurement planning, solicitation planning, and solicitation (Garrett, 2010, p. 20). FAR 7.102 states “agencies will perform acquisition planning and conduct market research for all acquisitions.” The acquisition team uses market research to determine existing capabilities available within industry to meet the requirements that the government chooses not fulfill in-house as part of the make-or-buy decision (Garrett, 2010, p. 23).

a. Step 1: Procurement Planning

Procurement planning can be recognized as “the process of identifying which business needs can be best met by procuring products or services outside the organization. This process involves determining whether to procure, what to procure, how to procure, and when to procure” (Garrett, 2010, p. 81). Procurement planning encompasses many elements. These elements include market research, source selection strategy, and contract type selection. Market research helps determine whether industry has the ability to handle the requirement, whether going forward with the solicitation will

be cost effective, and whether the best source selection strategy has been identified. Market research may be done through several means. Some examples are site visits, pre-solicitation conferences, literature published by providers, review of previously awarded contracts, and other open-source information commonly available on the Internet. During this step, a risk analysis must also be conducted. This is the process of determining how risk can affect “cost, schedule, and performance objectives of the project” (Rendon & Snider, 2008, p. 128). A guiding document, called the procurement management plan, is then created in order to provide a description of how to manage the rest of the procurement process of a contract. The statement of work (SOW) and additional preliminary documents will be generated to use in the solicitation planning step.

b. Step 2: Solicitation Planning

Next in the pre-award phase comes the solicitation planning step. A major element of solicitation planning is “preparing the documents needed to support the solicitation” (Garrett, 2010, p. 88). The SOW is considered a key ingredient of solicitation planning (Garrett, 2010, p. 88). The government generates a SOW to explicitly describe the requirements that the contractor must produce or perform. As a result, requirements must be clearly articulated within the SOW to avoid misinterpretation. More specifically, if the SOW is not an accurate portrayal of the requirements, then the administration process could become unnecessarily (and unjustifiably) problematic because its deficiencies will be passed on to the remaining steps of the contracting process. However, a statement of objectives (SOO) and performance work statement (PWS) may be utilized if appropriate. These allow for a less-intrusive management style by the government because the contractor is allowed to determine the method for fulfilling the requirement. Essentially, this document describes the product or service that the government requires and allows the contractor to find a way to accomplish the end state.

A hierarchy of priorities can be formed once the proposal evaluation factors are developed in the process. According to FAR 15.305, these factors may include “cost or price evaluation,” “past performance evaluation,” “technical evaluation,” “cost

information,” and “small business contracting evaluation” (FAR 15.305a1-5). When conducting solicitation planning, the government must determine whether to use one of two methods: request for proposal (RFP) or invitation for bid (IFB). If the government determines that an IFB will be used, then the government must use an LPTA source selection strategy and the “bids shall be evaluated without discussions” (FAR 14.101d). Conversely, if the government decides to issue an RFP, an LPTA or tradeoff source selection strategy may be used with or without discussions. The SOW, SOO, or PWS and other appropriate documentation will be included as part of the solicitation package.

Section M of the contract file is an important part of the solicitation planning step because it lays out the evaluation criteria and their relative importance (FAR 15.204–5b). As a result, close consideration of this section’s content must be observed in the solicitation planning step. Section M will also state the source selection strategy (LPTA or tradeoff). As part of a tradeoff source selection strategy, the solicitation shall state, “whether all evaluation factors other than cost or price, when combined, are

1. Significantly more important than cost or price;
2. Approximately equal to cost or price; or
3. Significantly less important than cost or price (10 U.S.C. 2305(a)(3)(A)(iii) and 41 U.S.C. 3306(c)(1)(C))” (FAR 15.304e).

However, if an LPTA source selection strategy is used, “price is the determining factor for award” assuming the contractor meets the minimum technical specifications and past performance requirements (Bunting, 2014, II.C.3). As a result, the contractor offering the highest technical specifications or past performance will not receive a contract award if they are not the lowest technically acceptable offeror.

c. Step 3: Solicitation

Solicitation is defined as “any request to submit offers or quotations to the Government” (FAR, 2016, 2.101). Part of solicitation is making sure “that all sellers have a clear, common understanding of the procurement (both technical requirements and contract requirements)” (Garrett, 2010, p. 91). This can be done through bidders’ conferences, which can be done in person or by digital means (Garrett, 2010, p. 91). In addition to known qualified sellers, additional sellers can be found in this step through

advertising (some types of procurement may make finding additional sellers mandatory). The government advertises through a government-wide point of entry (GPE). It is “the one point of entry to be designated by the Administrator of OFPP that will allow the private sector to electronically access procurement opportunities Government wide” (FAR, 2016, 2.101). Otherwise, normal advertising outlets can be used. Ultimately, the solicitation step culminates in formal bids or proposals submitted by interested contractors.

2. Award Phase

The second of the three phases is the award phase, which contains the source selection step. In this phase, the prospective contractor is awarded the contract. Before a contract award/purchase can be made, the contractor must be verified to be responsible in accordance with FAR 9.103. Both parties may engage in contract negotiations at this point to set terms and conditions that will provide a mutually beneficial environment for attaining their respective goals, or achieving a “win-win” agreement (Garrett, 2010, p. 136).

a. Step 4: Source Selection

The FAR states that “the objective of source selection is to select the proposal that represents the best value” to the government and the taxpayer (FAR, 2016, 15.302). The nature of the procurement often influences the execution of the source selection strategy. Depending on whether a sealed bid or a proposal is requested, the process will vary. Sealed bids simply use price as the deciding factor, as long as the bid is in accordance with the minimum technical and past performance criteria laid out in the IFB. Contracts awarded using a tradeoff source selection strategy will have established evaluation criteria in the solicitation planning step to ensure that the government receives the best value based on cost and performance. Although the term *best value* is often incorrectly used as a synonym for the tradeoff source selection strategy, the FAR recognizes that best value can be obtained using an LPTA or tradeoff source selection strategy. It also recognizes that cost may not be the most important factor for award. Therefore, in situations where requirements are clearly defined and risks are low, the government

should adopt an LPTA source selection strategy based on cost/price to determine best value. However, in situations where requirements are not as clearly defined and risks are greater, cost becomes a less important factor for award (FAR 15.101). Here, we begin to see the importance of LPTA and tradeoff strategies as the government seeks the best value contractor. As indicated in Figure 3, the left side of the best value continuum shows price as the most important factor. The right side of the continuum shows non-cost factors, such as technology, as the most important.



Figure 3. Best Value Continuum. Source: GAO (2014).

According to the LPTA source selection strategy, if the established technical standard is met, then the lowest offeror wins. This is represented on the left side of Figure 3. Tradeoff selections occur when the government desires to achieve an optimal level of technical capability and past performance relative to cost/price in pursuit of a best value product or service. This process can range in complexity. As depicted in Figure 3, it can start moderately, and as it progresses to the right, price is seen to be less important than the advantage (non-cost factor) gained.

3. Post-award Phase

Contract administration and closeout are the two steps of the post-award phase and are the last steps in the contract management process (Garrett, 2010, p. 162). Contract administration is an important step within the post-award phase because it

ensures that all elements of the contract are adhered to. Contract closeout is also important because it settles all remaining contract requirements, deliverables, and payment. Due diligence in contract administration and closeout can help avoid surprises, especially with more complex contracts.

a. Step 5: Contract Administration

Contract administration is performed to ensure that both the contractor and the government adhere to the contract terms and conditions. It typically consists of “1) conducting a pre-performance conference, 2) monitoring the contractor’s work results, 3) measuring contractor’s performance, and 4) managing the contract control process” (Rendon & Snider, 2008, p. 176). The pre-performance conference brings all parties together at the beginning of the contract for clarifications of the contract. As part of step 5, quality assurance personnel monitor work results and keep the contracting officer apprised of their observations. Earned value management (EVM) is one tool that quality assurance personnel use to track progress in major systems acquisitions (FAR 34.201). EVM measures planned cost and schedule against current status (Rendon & Snider, 2008, p. 178). For services, however, quality assurance is managed in accordance with the established quality assurance surveillance plan (QASP: FAR 37.604). The contract change control process is the portion of contract administration where changes are made to contracts as needed. When a change is needed, it must be made formally with contract modifications (Rendon & Snider, 2008, p. 178). There are two types of contract modifications. Bilateral modifications require the concurrence of both parties; unilateral changes can be executed by the contracting officer alone, as they are generally administrative in nature or do not fall outside the scope of the work (Rendon & Snider, 2008, p. 178). If a unilateral change is desired, the contracting officer must issue a change order (Standard Form 30) in accordance with the changes clause to execute the action (FAR 43.201).

b. Step 6: Contract Closeout and Termination

Contract closeout or termination is the last step of the process in which the contract can either be closed out or terminated for convenience or default (Rendon &

Snider, 2008, p. 180). All contracts must be closed in one of these three ways. Contract closeout, in a successful project, involves verifying project completeness and tending to administrative matters. The buyer has “inspected and accepted the supplies or services,” and any remaining invoices are processed (Garrett, 2010, p. 185).

The other forms of closeout, termination for convenience and termination for default, occur if successful completion cannot be achieved. When the government exercises a termination of the contract for convenience, it can be either complete or partial in accordance with the FAR (FAR 2.101). The government can do this unilaterally, without prejudice, to the contractor (Rendon & Snider, 2008, p. 180). Terminations for convenience require the government to “compensate the contractor fairly for the work done and the preparations made for the terminated portions of the contract, including a reasonable allowance for profit” (FAR 49.2). Termination for default is a different matter, and is the result of the government recognizing or anticipating failure by the contractor. If this measure is taken, it is also done in accordance with FAR Part 49. When the government decides to terminate a contract for default, it will not pay for “undelivered work and is entitled to repayment of advance and progress payments” (FAR 49.402). Using the default clause, the contracting officer can require that completed work and manufacturing materials associated with the job be transferred to the government. Before a termination for default is finalized, the government will typically deliver a cure notice or a show-cause notice to the contractor (Snider & Rendon, 2008, p. 181). A cure notice simply informs the contractor of the problem and requires that the contractor make the correction. A show-cause notice requires the contractor to give reason why the contract should not be terminated.

Additionally, during the contract closeout step, lessons learned are documented to help future project teams (Garrett, 2010, p. 188). CPARS ratings can be leveraged when documenting lessons learned (FAR 42.1501(b)). CPARS information is also an important factor in the source selection process, as we will see in the next section covering source selection strategies.

C. SOURCE SELECTION STRATEGY

This section addresses in detail the topic of source selection strategies. Executing the appropriate source selection strategy is step four of the contract management process and includes the results of detailed market research and thorough requirement(s) analysis. Source selection is considered strategic in nature because the selected strategy may have a significant effect on contract outcomes. The two primary source selection strategies are LPTA and tradeoff. They are discussed in the following section.

1. LPTA

When the government determines that cost/price is the most important evaluation criteria and that a minimum specified level of technical ability and past performance will achieve best value, contracting officers will typically utilize an LPTA source selection strategy. More specifically, the lowest-priced bid or proposal will be selected if the contractor meets or exceeds a specified and acceptable level of technical ability and past performance. The LPTA source selection strategy dictates, “the evaluation factors and significant sub-factors that establish the requirements of acceptability shall be set forth in the solicitation” (FAR 15.101–2(b)(1)). The source that meets or exceeds the standards specified by the government and has the lowest price will be selected as the provider. This source selection strategy does not permit tradeoffs when ranking proposals (Rene & Snider, 2008, p. 175). That said, the government can look at these but cannot use them to reject a source. Therefore, if a source meets the minimum standard and comes in at the lowest price, that source should win the award regardless of an alluring non-cost/price benefit from another source. Also, past performance will not be an evaluation criterion to differentiate contractors under the LPTA source selection strategy, assuming the contractors meet the minimum level of past performance as described in section 15.305 of the FAR (FAR 15.101–2(b)(1)).

2. Tradeoff

When best value is achieved by seeking “other than the lowest priced offeror or other than the highest technically rated offeror,” the tradeoff strategy is preferred (FAR 15.101–1(a)). This method allows the government some flexibility to award the contract

as shown in Figure 2 (Rendon & Snider, 2008, p. 175). This is done by allowing for “tradeoffs among cost or price and non-cost factors” which in turn “allows the Government to accept” a proposal that is not necessarily the lowest cost/price (FAR 15.101). The solicitation must state two FAR requirements in order for this method to be valid. Best value, unlike LPTA, requires relative importance of evaluation factors to be clearly stated in the solicitation (FAR 15.101–1). All of the other evaluation factors (collectively) must be stated relative to cost/price in the solicitation. According to the FAR, the government should state, excluding cost/price as a factor, the importance of all the factors combined as being “significantly more important than, approximately equal to, or significantly less important than cost or price” in the solicitation (FAR 15.101). As previously stated, this gives the government flexibility in awarding the contract; however, if a higher-priced item is chosen, it must be justified and documented (FAR 15.101–1). Therefore, it is up to the contracting officer to know which criteria are most important when awarding the contract best value can be achieved.

If these requirements are met, then the award should stand up to scrutiny. If not, a losing bidder could protest. The previous section discussed the contract management process and two different types of source selection strategies. The FAR states when each is appropriate. However, there is an ongoing debate as to which strategy actually provides the best value. The next section details recent GAO findings and the ongoing debate as to when contracting officers should employ the LPTA or tradeoff strategy, respectively.

D. CURRENT DEBATE

This section addresses relevant GAO findings and the current debate by practitioners within the DOD acquisition community as to when contracting officers should employ the LPTA or tradeoff strategy. These differing viewpoints on the subject indicate that the proper use of LPTA and tradeoff is still open to interpretation.

Starting in 1992, the GAO determined contract management in the DOD to be high risk (GAO, 2015). The GAO highlighted challenges in its investigative reports including acquisition workforce competency and capacity, aligning workforce with projected funding, service acquisition, contracting techniques and approaches, and

Operational Contracting Support (GAO, 2015). Of the aforementioned challenges, the areas of most concern with regard to source selection strategy are the contracting techniques and approaches. As a consequence of the DOD struggling with how to determine which contract type to utilize for a given requirement, the focus shifted to best value practices (GAO, 2015). As a result, Congress studied “DOD’s use of the best value Tradeoff process, specifically when non-cost factors were more important than price” (National Defense Authorization Act, 2010). Accordingly, contracts awarded in 2009 valued at \$25 million and up were reviewed concerning: (1) the frequency that the DOD utilized the best value tradeoff process by contract type, (2) DOD source selection strategy determinations and reasoning; and (3) challenges faced in the tradeoff process (GAO, 2010). The results of the review indicated that best value processes were used 95% of the time for competitively awarded contracts. Figure 4 shows a breakdown of the different source selection strategies found by the GAO during its investigation; tradeoff source selection strategy was used in 69% of awarded contracts.

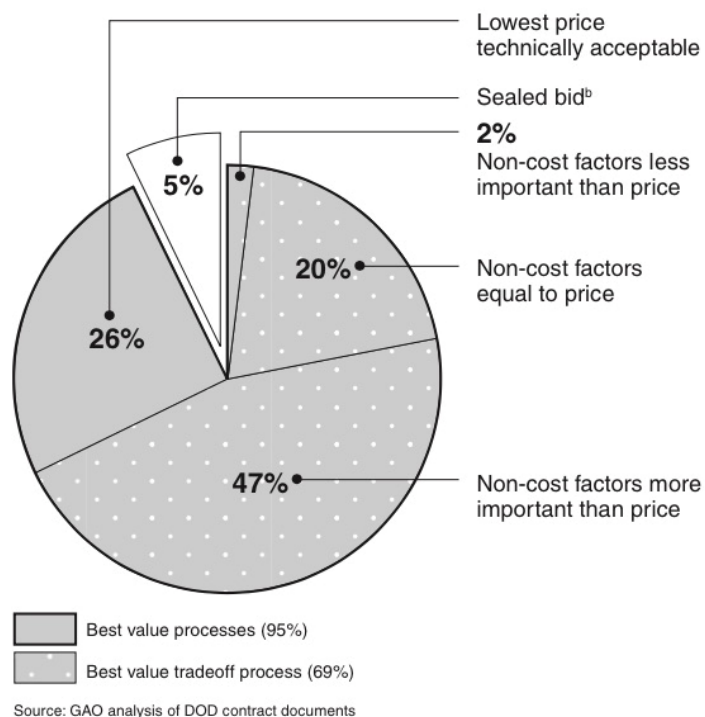


Figure 4. Results of GAO Review by Source Selection Strategy.
Source: GAO (2010).

The GAO found that when tradeoff source selection strategies were used, there was no difference between lower priced proposals and higher cost proposals in the DOD. When the DOD selected an offer that was not the lowest price, there was only a less than 5% difference in price. However, not all cases were that low; more specifically, the purchase of burn-resistant clothing for marines in Iraq. The 48% cost differential outweighed the lower price of the next offeror's proposal due to increased burn protection (GAO, 2010). The GAO concluded that for fiscal year 2009, the majority of competitive contract awards utilized best value tradeoff processes and that using that process effectively was dependent upon proper judgement in cost/price and non-cost/price evaluation factors. The GAO further suggested that the DOD create a viable training plan to aid their acquisition workforce in determining when a cost difference is justified during the tradeoff decision process (GAO, 2010).

In 2014, the GAO also reviewed the DOD's tradeoff process. The GAO examined contracts with obligations of over \$1M, guidance on best value execution, and Defense Acquisition University (DAU)/ departmental training provided to acquisition professionals. As before, the GAO found that tradeoff source selection strategies were utilized in the majority of contracts reviewed. They found that LPTA was used primarily for low dollar commercial acquisitions. However, the use of tradeoff decreased by 11% and LPTA increased by 10% from years 2009–2013; these changes are illustrated in Figure 5.

Source selection process	Fiscal year 2009 percent	Fiscal year 2013 percent	Statistically significant change ^a
Tradeoff	69	58	Yes
Lowest price technically acceptable	26	36	Yes
Sealed bid	5	6	No

Source: 2009: [GAO-11-8](#); 2013: GAO analysis of DOD solicitation documents. | GAO-14-584

Figure 5. Fiscal Years 2009 and 2013 Source Selections over \$25 Million.
Source: GAO (2014).

The GAO found that declining budgets caused the increase in use of LPTA source selection strategies. The GAO also found that organizations and DAU were providing more online and classroom training; however, DAU stressed that hands-on training was critical in ensuring truly educated decisions are made (GAO, 2014).

From the seller's viewpoint, Calisti describes some common misperceptions by industry concerning using the LPTA strategy and details when LPTA would be an appropriate source selection strategy and when it would not (Calisti, 2015, p. 17). Calisti describes industry's concerns regarding the government's perceived overuse of the LPTA source selection strategy (Calisti, 2015, p. 17). Industry believes the use of the LPTA source selection strategy results in "low cost, low quality" products and services, limits creativity and innovation, and reduces the DOD's technological advantage (Calisti, 2015, p. 17). In this instance, the private sector is insinuating the LPTA source selection does not lead to successful contract outcomes.

While Calisti generally agrees that the government often misuses the LPTA source selection strategy, he refutes industry's opinion that the use of the LPTA source selection strategy only results in "low cost, low quality" products and services by describing when the use of LPTA is useful and appropriate (Calisti, 2015, p. 20). Calisti argues that the LPTA source selection strategy should be used when the government has a low-risk and a well-defined requirement and when cost/price is the most important evaluation criterion (Calisti, 2015, p. 20). Well-defined requirements detail all necessary product or service specifications in a manner that is understood by both the government and the contractor. Conversely, the tradeoff source selection strategy should be used when the government expects greater risk of unsuccessful contract performance and will accept a cost/price that is higher for greater technical performance (Calisti, 2015, p. 20). In summary, Calisti believes that how well defined the requirement is, coupled with the anticipated risk of the contract outcome, should be the determining factor in deciding whether to use an LPTA or tradeoff source selection strategy.

Slate asserts that there are four relevant factors, regardless of source selection type, when awarding a contract. Those factors are "mission capability, proposal risk, past performance, and cost/price" (Slate, 2007, p. 17). This is in line with FAR 15.304. Slate

states that LPTA primarily focuses on acceptable mission capability over all other factors when determining the lowest price offeror that will be awarded the contract (Slate, 2007, p. 17). This supports the overall tenor of the “technically acceptable” portion of the LPTA source selection strategy. When using the tradeoff source selection strategy, however, he says that all of the four previously mentioned factors are considered in order to award a contract (Slate, 2007, p. 18). Slate then asserts that this process demonstrates that the government might pay more for any or all of the four factors. This viewpoint is supported by the FAR (FAR 15.101–1).

Bunting describes the perceived advantages and disadvantages of using LPTA or tradeoff strategies. Using an LPTA source selection strategy has advantages. These include “transparency,” “efficient source selection,” “low corruption risk,” and possibly being “protest proof” (Bunting, 2014, p. 12). The appearance of transparency can reduce negative feedback and not have “a general perception of unfairness in the evaluation process because the award decision affords minimal discretion” (Bunting, 2014, p. 12). The LPTA source selection strategy is also more efficient than a tradeoff strategy. Essentially, only two questions will need to be asked regarding the proposal. Is the proposal technically acceptable, and if yes, is it the lowest priced (Bunting, 2014, p. 12)? This will allow the proposals to be differentiated using the two main evaluation factors and will lead to a quicker award decision. The next advantage is the possibility of low corruption risk. Purchaser discretion will be “limited to determining whether an offeror’s proposal meets the minimum standard of acceptability” (Bunting, 2014, p. 12). The final advantage of the LPTA source selection strategy is that it may be protest proof. This is because the LPTA source selection strategy involves “far less discretion and complexity than the tradeoff process” (Bunting, 2014, p. 12).

The LPTA source selection strategy also has some disadvantages. These include “narrow application,” “high transaction costs,” “discouraged innovation,” and “reduced discretion” (Bunting, 2014, pp. 15–16). Since the appropriate use of an LPTA source selection strategy is for well-defined requirements, having a narrow application can lead to risks in awarding LPTA contracts that are not clearly defined (Bunting, 2014, p. 14). The second disadvantage is the potential for higher transaction costs. Contractors may

submit unrealistic cost proposals that meet the minimum technical specifications to win the contract award. In reality, the government may “incur significant financial costs in the long term for pursuing the lowest cost in the short-term” (Bunting, 2014, p. 15). To mitigate some of this risk, the FAR requires that contracting officers conduct cost realism analysis to determine if a contractor’s proposed cost/price is artificially low based on inconsistencies between the offeror’s technical and management approach and the associated cost/price (Garrett, 2010, p. 143). If the technical, management, and cost/price proposals are determined to be inconsistent, the contracting officer may reject the contractor’s proposal as unacceptable. Alternatively, a cost competitiveness analysis can determine if a contractor’s proposed cost/price is too high compared to what is available in the market (Garrett, 2010, p. 143). If the proposed cost/price is determined to be too high, the proposal can be removed from the competitive range. The third disadvantage is the potential for discouraged innovation. The LPTA source selection strategy only requires the offerors to meet the minimum technical specifications and does not incentivize the contractor for producing higher standards. Innovations go beyond what is required; they do not influence the evaluation (Bunting, 2014, p. 15). Reduced discretion is the final disadvantage. The LPTA source selection strategy “limits the agency’s discretion to use of business judgment” and has a “reduced degree of flexibility” (Bunting, 2014, p. 16).

Using the tradeoff source selection strategy has advantages compared to the LPTA source selection strategy. These include “learning,” “business judgment,” “flexibility,” and “customer satisfaction” (Bunting, 2014, pp. 5–7). The tradeoff strategy “provides an opportunity for the government to learn through the source selection process” (Bunting, 2014, p. 5). The government will be able to differentiate the quality differences that would otherwise only be known to industry experts (Bunting, 2014, p. 5). The next advantage is the use of business judgment. The tradeoff source selection strategy is highly subjective and this allows the source selection authority the ability to assess the qualitative measures based on their expertise (Bunting, 2014, p. 6). The third advantage is flexibility. The tradeoff process allows the source selection authority to have the flexibility to award the contract that is “not always the highest technically acceptable

rated proposal or lowest priced proposal” (Bunting, 2014, p. 7). The final advantage is customer satisfaction. By combining each tradeoff advantage, customer satisfaction can be improved by not limiting the contract award based only on cost/price factors (Bunting, 2014, p. 7).

The tradeoff source selection strategy also has some disadvantages. These include “corruption risk,” “suspicious offerors,” “game of chance,” and “complexity” (Bunting, 2014, pp. 8–11). The first disadvantage is the risk of corruption. The source selection authority is afforded broad discretion and has the potential to abuse this discretion in contract awards (Bunting, 2014, p. 8). The next disadvantage is by having suspicious offerors. Since the tradeoff source selection strategy is subjective, there are common allegations of misusing discretion to include “favoritism, unequal treatment, undisclosed evaluation factors, wiring the specification to a particular offeror or unduly restrictive specifications, and bias or predetermining the awardee” (Bunting, 2014, p. 9). The third disadvantage is the game of chance. This occurs when the offeror “must correctly guess the agency’s preference for a high-quality, high cost solution or a lower-quality, lower-cost solution” (Bunting, 2014, p. 9). The final disadvantage is complexity. The tradeoff source selection strategy is extremely cumbersome and “requires extensive solicitation preparation, a lengthy evaluation period, and the business judgment to make sound tradeoff decisions,” and is “more susceptible to protests” (Bunting, 2014, p. 11).

All of these articles revolve around the central theme of determining when the use of each strategy is appropriate. The disadvantages of each are even brought to the forefront by one of the authors. The articles stress the proper application of these source selection strategies. In doing so, an underlying question emerges that we will seek to answer with this research: Are pre-award and post-award contract elements affected by source selection strategy? If a relationship does exist, then acquisition professionals should devote more time and resources in determining the appropriate source selection strategy.

E. SUMMARY

Chapter II described applicable contract management statutes and regulations, the contract management process, and the differences between source selection strategies. It also detailed the current debate concerning LPTA and tradeoff source selection strategies. The information provided in this chapter lays the foundation and provides context for this research and analysis. Military systems commands are a valuable source of contract data to analyze how the LPTA and tradeoff source selection strategies affect short- and long-term contract outcomes. Chapter III will discuss the DOD acquisition organization and responsibilities, including two naval systems commands where the contract data was collected for this research.

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III. NAVAL SYSTEMS COMMANDS

This chapter discusses the two naval systems commands selected for this research, SPAWAR and NAVSUP, as well as the DOD acquisition chain of command to which they are included. More specifically, this chapter offers a top-level description of the acquisition organizational structure within the DOD and the Navy, as well as those of SPAWAR and NAVSUP. Although these two organizations have vastly different contracting requirements, the commonality is that they both follow applicable statutes, the FAR, and the six-step contract management process. The following analysis provides insight into the individual command organizational structures and responsibilities, mission sets and customers, and procurement and contract management departments.

A. DOD ACQUISITION ORGANIZATION

The acquisition organizational structure within the DOD is hierarchical in nature and comprises multiple echelons of expertise and support. The Undersecretary of Defense for Acquisition, Technology, and Logistics (USD[AT&L]) acts as “the principal staff assistant and advisor to the Secretary of Defense and Deputy Secretary Defense for all matters concerning acquisition, technology, and logistics” (OUSD[AT&L], 2015a). Figure 6 depicts the organizational structure of the Office of the USD[AT&L] (OUSD[AT&L], 2015b). This appointed official receives support from a principal deputy and oversees 11 unique directorates with responsibilities ranging from the analysis of acquisition resources to defense procurement and acquisition policy (OUSD[AT&L], 2015b). The assistant secretary of defense for acquisition (OASD[A]) supports the individual directors by monitoring acquisition programs in areas such as tactical warfare systems; space; and strategic and intelligence systems; and C3, cyber, and business systems (OUSD[AT&L], 2015b). The professionals who fill these positions are acquisition subject matter experts and enable the USD[AT&L] to execute the responsibilities of supervising DOD-wide acquisition programs and establishing acquisition policies (OUSD[AT&L], 2015a). To achieve viable acquisition programs while protecting taxpayer funds, the OUSD[AT&L] guides DOD procurement and

contract management procedures by issuing three key policy documents including DOD Directive (DODD) 5000.01, DOD Instruction (DODI) 5000.02, and multiple iterations of the Better Buying Power initiative (DOD, n.d.-a). DODD 5000.01 “provides management principles and mandatory policies and procedures for managing all acquisition programs” and sanctions the publication of DODI 5000.02 (DOD, 2007). DODI 5000.02 provides detailed procedures to direct the operation of the DOD acquisition system in accordance with DODD 5000.01 (DOD, 2015). The BBP initiative was promulgated to “restore affordability in defense procurement and improve defense industry productivity” (DOD, n.d.-b). BBP expands on existing acquisition principles and procedures by concentrating on eight initiatives, as described in a memo from the Under Secretary of Defense:

- Achieve affordable programs...
- Achieve dominant capabilities while controlling lifecycle costs...
- Incentivize productivity in industry and government...
- Incentivize innovation in industry and government...
- Eliminate unproductive processes and bureaucracy...
- Promote effective competition...
- Improve tradecraft in acquisition of services...
- Improve the professionalism of the total acquisition workforce (Kendall, 2015, Attachment 1)

BBP applies to all components of the DOD acquisition organization from contracting officer’s representatives (CORs), contract specialists, and contracting officers, to program managers and senior acquisition executives.

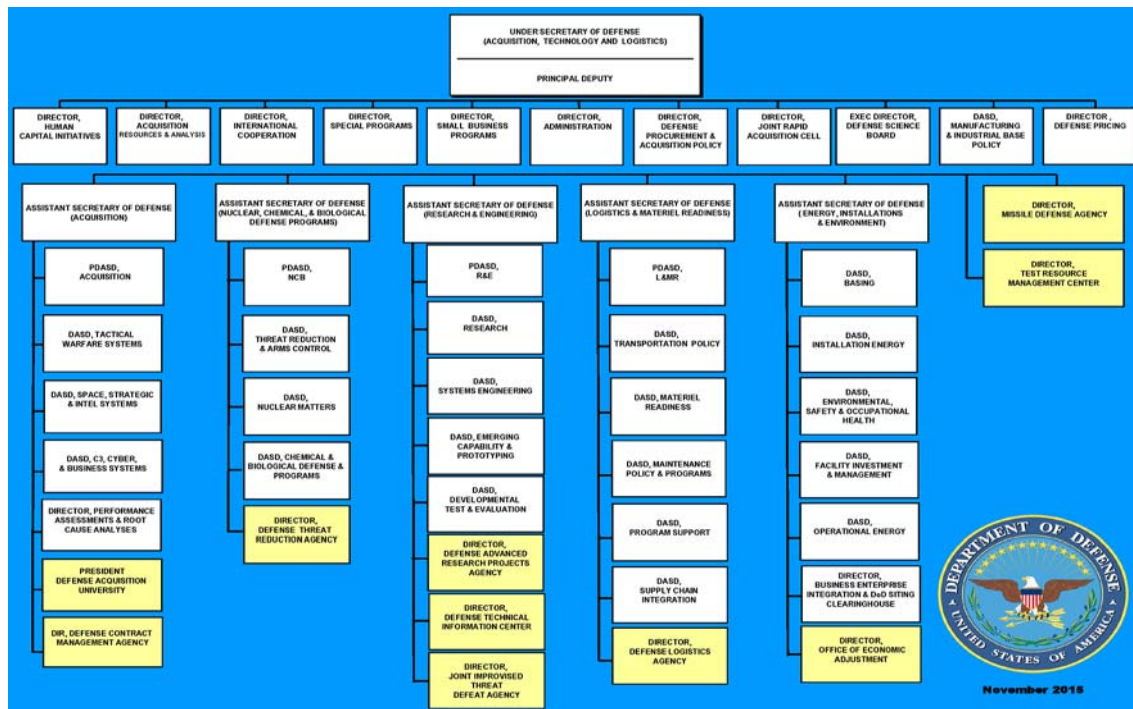


Figure 6. AT&L Offices Organizational Chart. Source: OUSD(AT&L) (2015b).

B. NAVY ACQUISITION ORGANIZATION

Below the OUSD[AT&L], military service-specific acquisition executives implement contracting and program management policies in accordance with the DOD 5000 series directives and instructions (ASN [RD&A] , n.d.-a). The assistant secretary of the Navy for research, development, and acquisition (ASN [RD&A]) “represents the Department of the Navy to USD(AT&L) and to Congress on all matters relating to acquisition policy and programs” (ASN [RD&A], n.d.-a). As portrayed in Figure 7, the ASN [RD&A]’s staff includes a principal military deputy and a principal civilian deputy, along with an assistant general counsel and a director for acquisition career management (ASN [RD&A], n.d.-a). ASN [RD&A] leads a large and complex naval acquisition organization composed of fourteen program executive offices (PEOs), seven systems commands (SYSCOMs), and nine deputy assistant secretaries (ASN [RD&A], n.d.-a). The fourteen PEOs and their program managers (PMs) supervise “the development and acquisition of Naval systems” including the Joint Strike Fighter, Space Systems, Littoral Combat Ships, and Unmanned Aviation and Strike Weapons, among others (ASN

[RD&A], n.d.-a). In coordination with the PEOs, the seven SYSCOMs and their various field offices directly manage the acquisition and support of the Navy's complex weapons systems and capabilities (ASN [RD&A], n.d.-a).

Office of the Assistant Secretary of the Navy
(Research, Development and Acquisition)

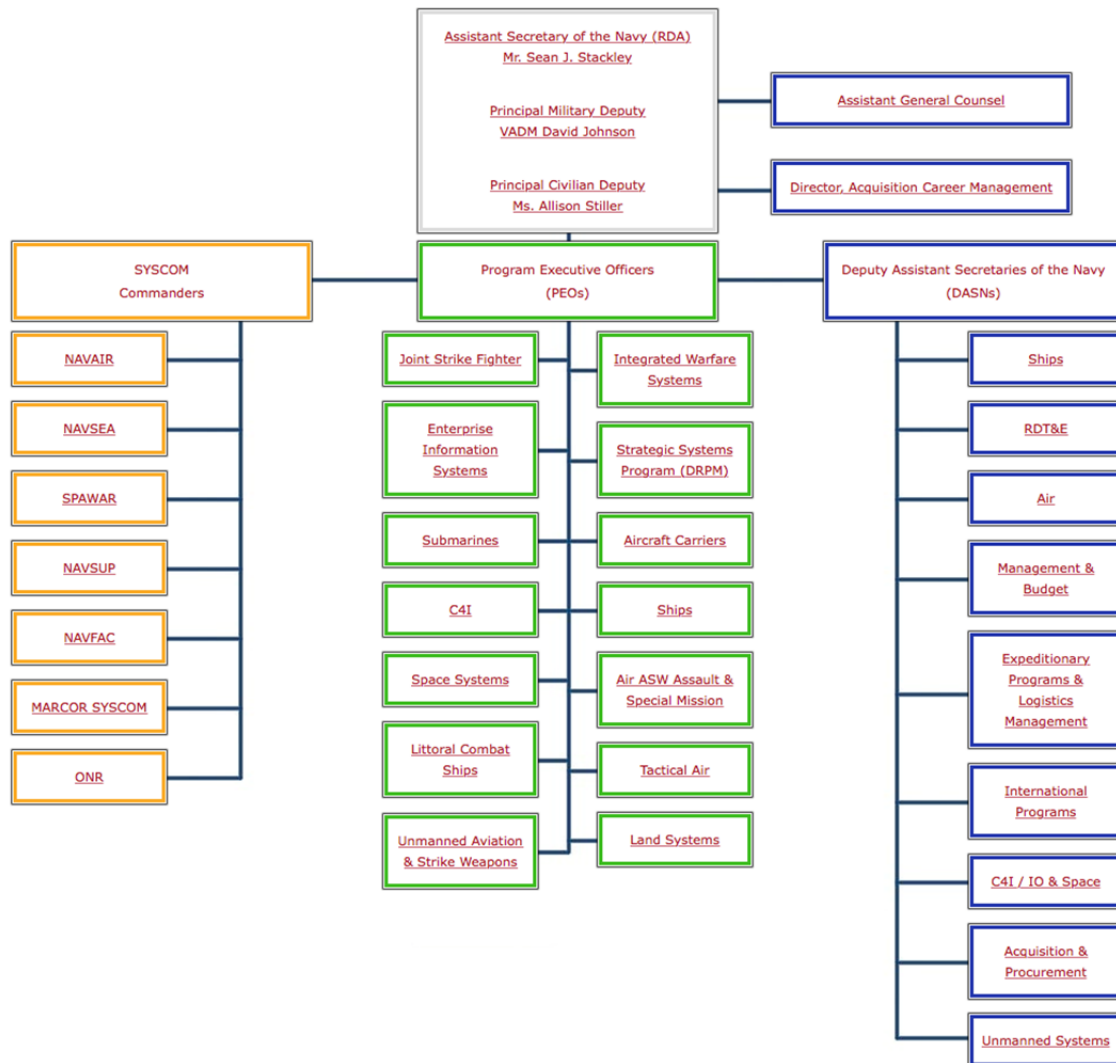


Figure 7. ASN [RD&A] Organization Chart. Source: ASN [RD&A], (n.d.-a).

One of ASN [RDA]'s principal deputies is the deputy assistant secretary of the Navy for acquisition and procurement (DASN AP) (ASN [RD&A], (n.d.-a). DASN AP is the Navy's primary subject matter expert regarding acquisition policy and the legal

framework including all applicable laws, statutes, and regulations (ASN [RD&A], n.d.-b). The DASN AP reports directly to ASN [RD&A] and is supported by a senior executive director and four subordinate directors (ASN [RD&A], n.d.-b). The DASN AP's primary duties and responsibilities are to:

- “Provide advice and staff support to the ASN(RD&A) on acquisition (Contracting & Business) and logistics issues
- Serve as the DoN Competition Advocate General
- Establish acquisition and logistics policy to:
 - Comply with laws and regulations
 - Promote & protect DoN & taxpayer interests
 - Ensure consistent and standardized business practices
- Facilitate and improve the acquisition system” (ASN [RD&A], n.d.-b)

One important aspect of the DASN AP's policy responsibilities include the analysis and interpretation of the NMCARS, DFARS, and the FAR to ensure naval acquisition professionals receive the most accurate and up-to-date guidance (DASN AP, 2016).

C. SPAWAR ORGANIZATION

The Space and Naval Warfare Systems Command (SPAWAR) enables and executes information warfare and dominance capabilities for the Department of the Navy (SPAWAR, 2016g). The term information dominance refers to “the operational advantage gained from fully integrating the Navy's information functions, capabilities and resources to optimize decision making and maximize war-fighting effects” (Department of the Navy, 2013). SPAWAR is organized to develop, deliver, and sustain warfighter communications and information connectivity (SPAWAR, 2016g). SPAWAR consists of a headquarters office, two primary systems centers, and a space support activity. SPAWAR also maintains a partnership with a series of program executive offices (PEO) to acquire, deliver, and support the hardware and software needs of naval forces (SPAWAR, 2016g). PEO for Command, Control, Communications, Computers, and Intelligence (C4I) is tasked with acquiring, developing, and sustaining the Navy's C4I capabilities (SPAWAR, 2016d). PEO for Space Systems manages the Navy's space research, development, and acquisition activities (SPAWAR, 2016f). Lastly, PEO for

Enterprise Information Systems (EIS) manages the Navy's information technology programs in support of all Sailors and Marines, both deployed and stateside (SPAWAR, 2016e). Navy PEOs are echelon II organizations chartered by the Secretary of the Navy (SECNAV) (SPAWAR, 2016c). They work in consonance with the headquarters staff and the systems centers to create and sustain viable programs to support the warfighter. Figure 8 depicts SPAWAR's organizational command structure (SPAWAR, 2016b).

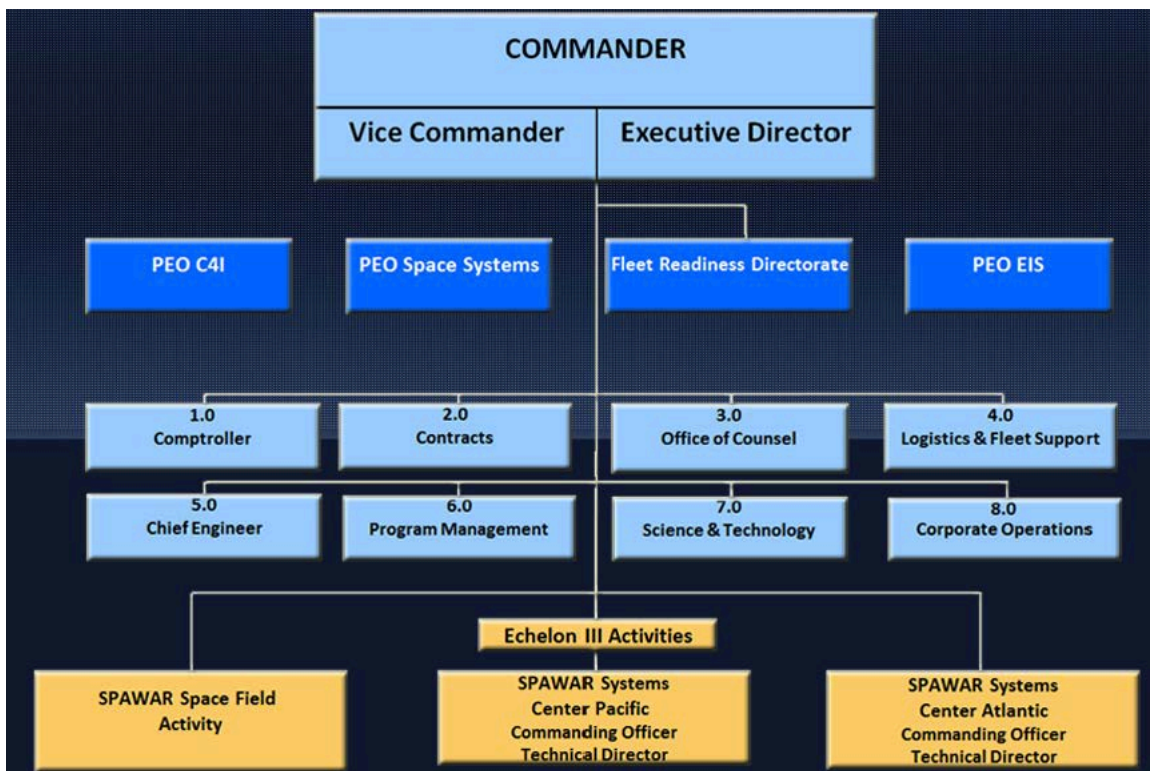


Figure 8. SPAWAR Organization Chart. Source: SPAWAR (2016b).

SPAWAR is an echelon II organization led by a military flag-level commander. The commander executes the mission with the assistance of a military flag-level vice commander, a senior civilian executive director, a fleet readiness directorate, and a series of specialized departments (SPAWAR, 2016b). SPAWAR headquarters (SPAWAR HQ) organizes its departments numerically as follows:

- “1.0 Comptroller
- 2.0 Contracts

- 3.0 Office of Counsel
- 4.0 Logistics and Fleet Support
- 5.0 Chief Engineer
- 6.0 Program Management
- 7.0 Science and Technology
- 8.0 Corporate Operations” (SPAWAR, 2016b)

“SPAWAR is a competency aligned organization (CAO)” and arranges its departments to achieve and maintain the following eight core competencies:

- Financial
- Contracts
- Legal
- Logistics and Fleet Support
- Engineering
- Acquisition and Program Management
- Science and Technology
- Corporate operations (SPAWAR, 2016a)

SPAWAR HQ 1.0 (comptroller) department executes the financial competency by providing program support services including cost estimation, business financial management, accounting, and budgeting (SPAWAR, 2016a). The comptroller staff coordinates with DOD budgeting offices and other internal departments to safeguard SPAWAR’s funding in a fiscally constrained environment. SPAWAR HQ 2.0 (contracts) department executes the contracting competency by performing procurement and contract management functions for SPAWAR’s program offices and related PEOs (SPAWAR, 2016a). SPAWAR contracting officers and other contracting professionals leverage their business acumen and a cooperative relationship with industry to pursue best value acquisitions for the warfighter, the government, the industrial base, and the taxpayer while maintaining ethical standards of conduct.

SPAWAR HQ 3.0 (office of counsel) department executes the legal competency by providing legal services with respect to acquisition statutes, intellectual property law, environmental regulations, standards of conduct, and FOIA programs (SPAWAR, 2016a). SPAWAR’s legal professionals ensure command compliance with federal statutes and regulations, DOD policy directives, and internal guidance by providing legal advisory services. SPAWAR HQ 4.0 (logistics and fleet support) department executes

their competency by governing SPAWAR's logistics and support efforts and ensuring that sound logistics principles are applied throughout the organization (SPAWAR, 2016a). SPAWAR HQ 5.0 (chief engineer) department executes the engineering competency by providing technical leadership and systems engineering services for all of SPAWAR's acquisition programs (SPAWAR, 2016a).

SPAWAR HQ 6.0 (program management) department executes their competency by utilizing a common acquisition and project management framework to ensure major programs meet cost, schedule, and performance requirements (SPAWAR, 2016a). SPAWAR HQ 7.0 (science and technology) department executes their core competency by conducting scientific experimentation and leveraging industry and academia to identify and transform new technologies into useful applications (SPAWAR, 2016a). SPAWAR HQ 8.0 (corporate operations) department executes their core competency by supervising total force management, information technology management, corporate strategy, public affairs, and special program overview and compliance (SPAWAR, 2016a). SPAWAR performs its diverse set of missions and core competencies through a geographically dispersed organizational structure. Figure 9 depicts the locations of SPAWAR offices and field activities throughout the United States (DTIC, 2012).



SPAWAR Locations in CONUS

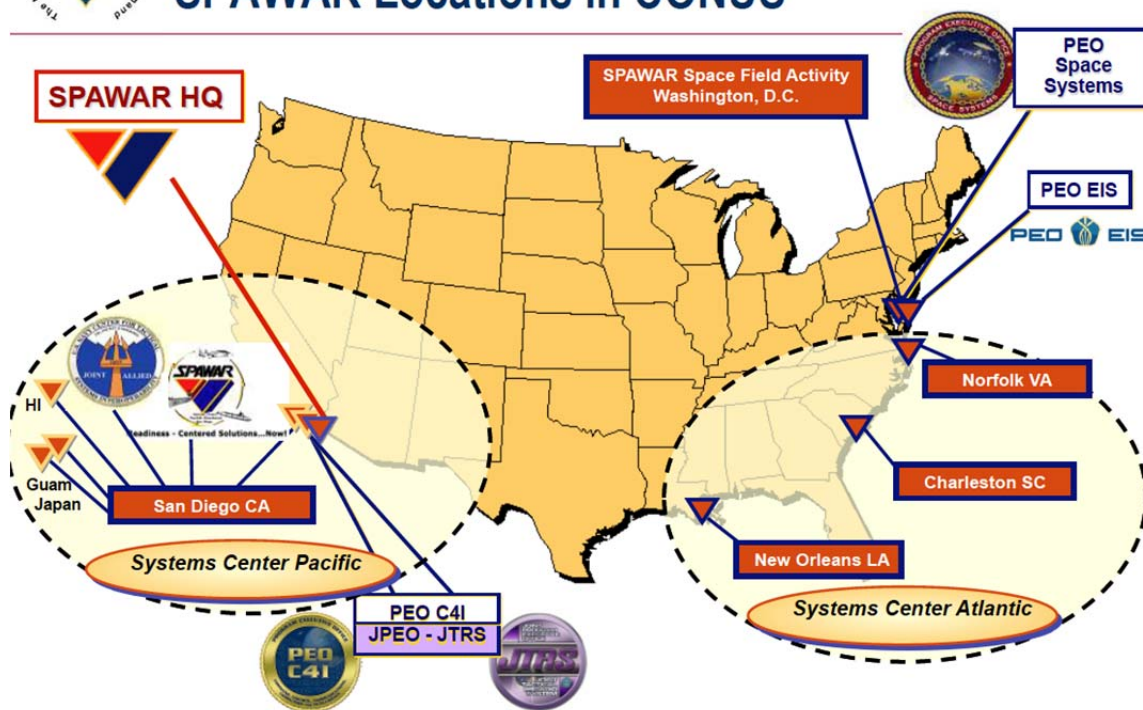


Figure 9. Primary and Subsidiary SPAWAR Offices. Source: DTIC (2012).

SPAWAR HQ operates out of San Diego, California, along with SPAWAR Systems Center Pacific (SSC PAC), one of two echelon III systems centers within the SPAWAR hierarchy, and PEO C4I (DTIC, 2012). SSC PAC is the Navy's primary RDT&E laboratory for command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) and maintains field offices in Hawaii, Guam, and Japan (SPAWAR, 2016j). SPAWAR Systems Center Atlantic (SSC LANT) is the second echelon III systems center in the SPAWAR hierarchy. SSC LANT resides in Charleston, South Carolina, and maintains field offices in Norfolk, New Orleans, Tampa, and Washington, DC (SPAWAR, 2016i). SSC LANT also has a presence overseas including Stuttgart, Naples, Djibouti, and Bahrain (SPAWAR, 2016i). SSC LANT works in conjunction with PEO Space Systems, PEO EIS, and SPAWAR Space Field Activity (SSFA) to deliver multiple capabilities including C4ISR, information operations, information assurance, business information technology, enterprise information services,

and space systems (SPAWAR, 2016i). PEO Space Systems and PEO EIS are located in Virginia (DTIC, 2012). SSFA is an echelon III organization located in Northern Virginia and manages the Navy's space sensors and satellite communications in conjunction with the National Reconnaissance Office (SPAWAR, 2016h).

One commonality amongst all of SPAWAR's echelon II and III organizations is a heavy reliance on contracting support. SPAWAR contracting professionals within SPAWAR HQ, SSC PAC, and SSC LANT work closely with industry to provide quality acquisition support to all program offices and SPAWAR PEOs. Figure 10 depicts SPAWAR's contracting support in monetary terms during the span of one fiscal year (SPAWAR, 2015).

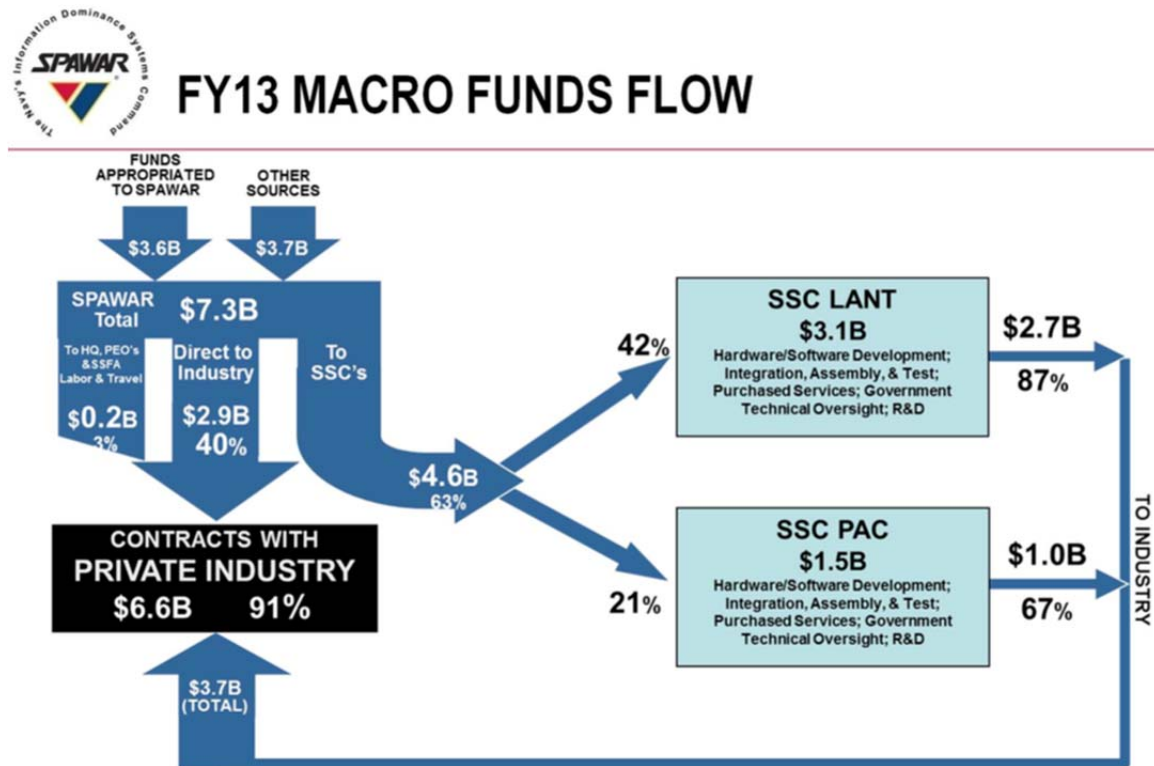


Figure 10. SPAWAR FY13 Macro Funds Flow. Source: SPAWAR (2015).

According to SPAWAR's latest macro funds flow analysis, the organization received \$7.3 billion in funding for FY13 (SPAWAR, 2015). Of the \$7.3 billion, SPAWAR HQ 2.0 (contracts) executed \$2.9 billion in contract actions, with an additional

\$2.7 billion and \$1 billion executed by SSC LANT and SSC PAC contracting staffs, respectively, for a total of \$6.6 billion (SPAWAR, 2015). SPAWAR's contracting efforts directly support critical requirements, including the following:

- Hardware and software development
- Systems integration, assembly, and testing
- Acquisition of contractor services
- Research and development
- Technical, industrial and logistics support (SPAWAR, 2015)

These efforts are in line with SPAWAR's primary mission and provide the warfighter with the greatest technical and communication capacity to operate effectively in any environment around the globe.

D. NAVAL SUPPLY SYSTEMS COMMAND (NAVSUP) ORGANIZATION

NAVSUP is an Echelon II command that provides quality of life support and global logistics support to naval and joint forces. Through a centralized inventory management system, they are able to provide material support to naval and joint weapons systems, ships, aircraft, and submarines. They also provide waterfront fleet logistics support, base operating support services, service and supply contracting, material delivery coordination, and provide material management and warehousing service solutions (NAVSUP, 2016l). Figure 11 describes the organizational structure within NAVSUP.

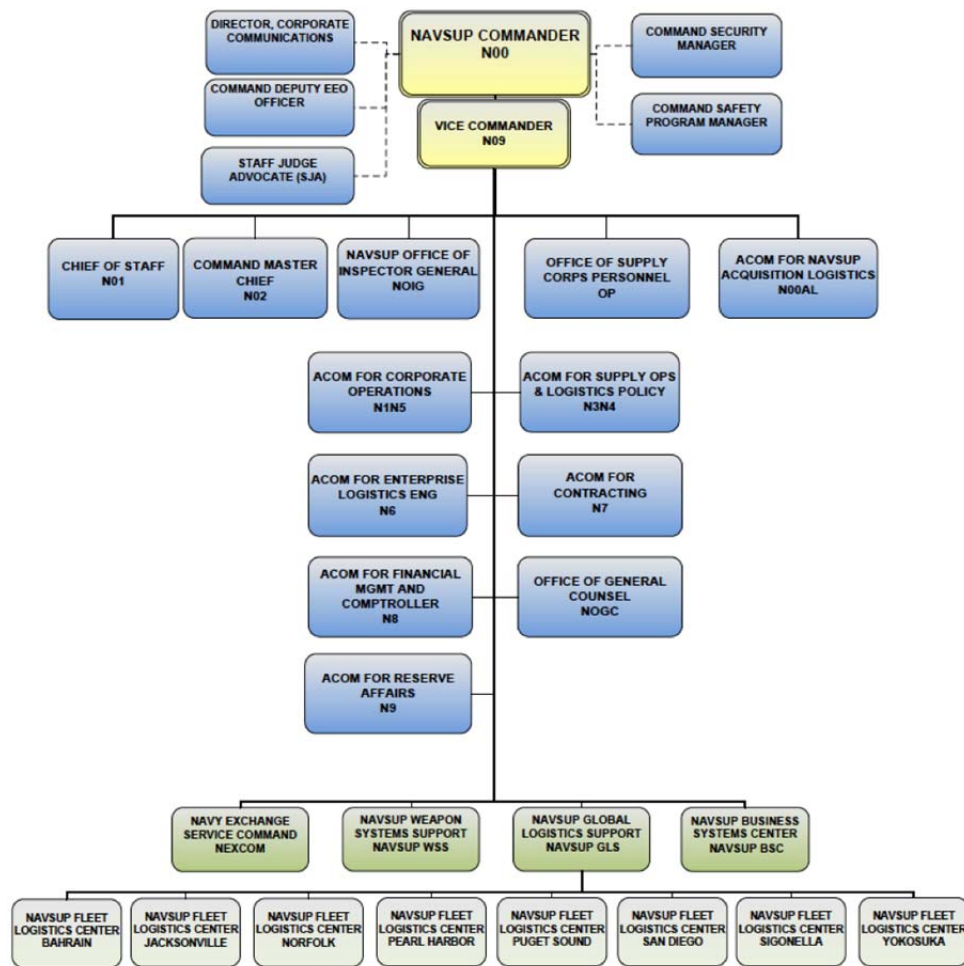


Figure 11. Naval Supply Systems Command Organization.
Source: NAVSUP Organization (2016k).

Many of the Navy's quality of life programs are managed by NAVSUP, including Navy Lodges, Naval Exchanges, Household Goods, and the Fleet Mail (NAVSUP, 2016i). They manage the Navy's Food Service Program and are responsible for generating and promulgating policy governing general mess operation at sea and ashore.

Concerning contracting authority, NAVSUP Global Logistics Support (GLS) and Naval Exchange Command (NEXCOM) exercise unlimited contracting authority through the Navy Field Contracting System (NFCS) (NAVSUP, 2016f). NAVSUP Weapon Systems Support (WSS) is its own head of contracting activity (HCA) but NAVSUP code 02 provides contract policy and oversight to headquarters and all NAVSUP elements.

Additionally, 1,200 purchase card programs fall under the NAVSUP HCA, two activities (NAVMEDLOGCOM and NAVOCEANO) fall under NAVSUP's large contracting authority, and NAVSUP simplified acquisition procedures (SAP) authority is exercised at 24 activities

The NAVSUP Assistant Commander for Contracting (N7) strategically leads the NAVSUP contracting community and provides a structure for delivery of services throughout the Navy Field Contracting System (NFCS) (NAVSUP, 2016f). N7 also serves on the HCA principal staff for matters concerning contracting policy, review of operations, and approval actions. For purchasing matters or management of contracting matters, N7 acts for the HCA under purview of NAVSUP and executes policy and oversight for WSS.

The NAVSUP Assistant Commander for Contracting also represents the HCA and NFCS on issues concerning higher authority. Working with the Inspector General (IG) and Office of General Counsel (OGC), N7 develops and issues procedural guidance to detect and combat fraud. N7 also functions as executive agent for matters concerning the Navy Supplies and Services Contingency Contracting Program, Navy Simplified Acquisition Program, Navy contract reporting, and Navy and Marine Corps Strategic Sourcing. In addition, N7 also functions as executive agent for all Navy contracting policy covering the Javits Wagner O'Day (JWOD) Act, the program manager for NAVSUP command Procurement Performance Management Assessment Program (PPMAP), and APC for NAVSUP overseeing all HCA purchase-card holders. In conjunction with NAVSUP Business Systems Center (BSC), N7 is also the functional lead for the Navy Electronic Commerce Online (NECO), issues with automated procurement, and the Standard Procurement System (SPS) (NAVSUP, 2016f).

E. NAVSUP WEAPON SYSTEMS SUPPORT

NAVSUP Weapon Systems Support (WSS) employs more than 2,300 military and civilians and serves as Navy and Marine Corps weapons systems supply chain manager (NAVSUP, 2016g). They provide program support to Naval, Joint and Allied forces weapons systems.

The 02 Contracts Directorate is employs over 200 military and civilians that operate as a unified organization from two geographically separated locations in Mechanicsburg and Philadelphia, Pennsylvania (Graham, 2013). Combined, more than 34K contract actions valued at \$3 billion are executed by the sites.

NAVSUP WSS 02 consists of seven procurement departments with unique customer bases. They are responsible for a broad range of contracting services to include performance based logistics, services, repair, and procurement (Graham, 2013). Philadelphia houses three contracting departments; the departments provide support to the aviation arms of U.S. military services and foreign military. Mechanicsburg also houses three contracting departments, which provide support to maritime, foreign military operations, and information technology customers. The seventh department is located in both sites and acts as a resource for both sites that provides “acquisition policy, process management, training, and personnel management oversight across the entire directorate” (Graham, 2013).

The seven departments mentioned above are primarily supplier-oriented; their primary goal is to build key relationships with suppliers in order to support cognizant weapons system programs throughout the acquisition life cycle (Graham, 2013). Each department is aligned with an Integrated Weapon Systems Team (IWST), which proves advantageous to NAVSUP in providing contracting and supply support for their customers. Additionally, two buying detachments from DLA are collocated within each of the major WSS sites in order to augment procurement of repairable and consumable spare parts.

Some of the major acquisition programs include the following.

1. Aviation - Philadelphia

Code 022, Fixed Wing Contracts. “Provides contracting support to multiple IWST customers/platforms including F/A-18, AV-8, E-2/C-2, P-3, H-53/60/46, EA-6B and V-22” (Graham, 2013). A recent major contract was awarded for an aircraft auxiliary power unit. Utilizing a firm fixed price contract, the award is a five-year PBL renewal and serves as the foundation for future Joint Service/DLA PBL contracts (Graham, 2013).

Code 023, Rotary Wing Contracts. “Provides contracting support to multiple IWST customers/platforms, including the H-1, H-46, H-53, H-60, EA-6B, V-22, and E-2/C-2 (Graham, 2013).” A joint PBL was recently awarded for the V-22 aircraft, the contract will provide more than four years of support for over 168 items; valued at \$218.4 million, the cost-plus incentive fee contract will provide enduring support for the Air Force’s CV-22 and the Marine Corps’ MV-22 (Graham, 2013).

Code 026, Common Systems. “Provides contracting support to all major aviation IWST customers and platforms” (Graham, 2013). Some recent major contract awards include a commercial firm fixed price PBL for the T700 turboshaft, providing three years of support. 1,500 Marine and Navy aircraft are supported by the PBL that is valued at more than \$107 million (Graham, 2013).

2. Maritime–Mechanicsburg

Code 021, Maritime Systems. “Provides contracting support to multiple IWST customers and platforms, including Hull Mechanical and Electrical (HM&E), MK99 Fire Control, WSN-7, BPS, IBS, SPY Transmitter, Q-70, ARCI, MK41 VLS, USC-38, CEC, CIWS, and NATO Sea Sparrow” (Graham, 2013). A recent major contract award was for the AEGIS SPY-1 Radar, the PBL renewal is a five-year contract for AEGIS based fleet assets. Valued at over \$37 million, the contract supports more than 1,650 items (Graham, 2013).

Code 024, Level 1/SUBSAFE and Ammunition Systems. “Provides specialized contracting support for CAD/PAD, Airborne Expendable Countermeasures Program, Lightweight Torpedoes, Level 1 Sub Safe, CARPER, TRIPER/AERP, and 2S COG (Graham, 2013).” Code 024 processes spare and repair requirements for the military sealift command and submarine fleet through requisitioning for replenishment of inventory and spot purchasing. “The Ammunition Systems division provides very specialized contracting support, primarily to external customers, for the procurement of flare and chaff, ammunition, pyrotechnics, and other munitions pertaining to training and operational requirements” (Graham, 2013).

Code 027, IT Products and Services. “Provides procurement support for automation hardware, software and systems from commercial sources for use by NAVSUP and other DoD operating sites” (Graham, 2013). Their information technology services contracting office is the second largest in the DON and is responsible for over \$400 million in procurement annually (Graham, 2013).

3. Dual-Site

Code 025, Acquisition Policy, Technology and Resources. “Provides all of the resource and budget management, policy dissemination, training, metrics and staff support for the entire Contracting Directorate... serves as NAVSUP’s program manager for the Integrated Technical Item Management and Procurement (ITIMP) contract writing system... performs internal contract reviews and is the lead for all contracting-specific reviews performed by external entities” (Graham, 2013).

F. NAVSUP GLOBAL LOGISTICS SUPPORT

NAVSUP Global Logistics Support (GLS) provides operational logistics capabilities to the Navy, Joint, and Allied Forces through eight subsidiary NAVSUP Fleet Logistics Centers (FLCs). Per the NAVSUP GLS website, they are based in San Diego; Norfolk, Virginia; Jacksonville, Florida; Yokosuka, Japan; Pearl Harbor, Hawaii; Bremerton (Puget Sound), Washington.; Sigonella, Italy; and Bahrain (NAVSUP, 2016e). NAVSUP GLS monitors the performance of waterfront and support while managing operations of the NAVSUP FLCs. Each NAVSUP FLC offer the following support to their respective regions: contracting, global logistics services, hazardous material management, fuels, logistics operations, material management, regional transportation, integrated logistics support, household goods movement support, postal, warehousing, base supply support for Navy installations, and ammunition (NAVSUP, 2016e).

For contracting, NAVSUP Global Logistics Support employs a lead contracting executive (LCE) who serves as contracting support lead for the NAVSUP FLCs. Five civilians and one military staff the LCE (NAVSUP, 2016f). The LCE’s mission is to manage all FLC field contracting operations as one streamlined entity operating across the globe (NAVSUP, 2016f).

The LCE is also responsible for field management over NAVSUP FLC contracting operations in conjunction with the Chiefs of Contracting in the following locations: San Diego, California; Norfolk, Virginia; Philadelphia, Pennsylvania; Bremerton, Washington; Jacksonville, Florida; Yokosuka, Japan; Sigonella, Italy; and Pearl Harbor, Hawaii (NAVSUP, 2016f). The LCE is also responsible for management over Procurement Performance Management Assessment Programs (PPMAP) in Norfolk and San Diego, which administer and evaluate limited procurement authority purchase card activities and programs for NAVSUP proper (NAVSUP, 2016f).

With an acquisition workforce spanning all of the FLCs, GLS employs over 24,000 civilian employees and 345 military personnel. It also awards 85,000 to 88,000 contracts worth between \$3.6 billion and \$4.4 billion annually (NAVSUP, 2016f).

1. NAVSUP FLC San Diego

NAVSUP FLC San Diego serves Navy, Marine, Coast Guard, and MSC fleet and shore commands/components throughout the Southwest region. According to the NAVSUP website, “NAVSUP FLC San Diego delivers combat capability through logistics by teaming with regional partners and customers to provide supply chain management, procurement, contracting and transportation services, technical and customer support, defense fuel products and worldwide movement of personal property” (NAVSUP, 2016c).

Code 200, the contracting department, provides regional contracting support and is responsible for purchasing functions to include centralized buying as dictated by NAVSUP GLS based on NAVSUPSYSCOM guidance (NAVSUP, 2016d). They provide acquisition services for third party logistics, direct vendor delivery, A-76, base support services (household goods, food services, transportation, warehousing, and HAZMAT), engineering and technical support services, maintenance, equipment and hardware, port services, habitability, NMCI networks, and repair services and components for aircraft and ships (NAVSUP, 2016d). NAVSUP FLC San Diego Contracting Department is comprised of acquisition workforces located in San Diego, California; Seal Beach, California; Monterey, California; and Lemoore, California.

2. NAVSUP Business Systems Center

NAVSUP Business Systems Center (BSC) supports the Navy, DOD components, and international partners with logistical support information technology. They accomplish this through executing design, development, sustainment, integration, and implementation of best-value logistics and financial business systems for the Navy, the DOD, international partners, and federal agencies (NAVSUP, 2016b).

NAVSUP BSC functions as the central design agency for the Navy enterprise information technology and management solutions, emphasizing finance, business intelligence, and supply chain products and services (NAVSUP, 2016b). They are the primary agent for logistics and quality-of-life IT support, and they function as a bridge to other partners in the naval support network. As a central design facility, BSC is the DOD's primary provider of non-tactical information systems for the DOD, NAVSUP Enterprise, and international customers (NAVSUP, 2016b).

3. Navy Exchange Service Command

The Navy Exchange Service Command (NEXCOM) is based out of Virginia Beach, Virginia. Their primary mission is providing discounted goods and services to support quality of life programs for military active duty, reservists, retirees, and their dependents. NEXCOM is a field activity of NAVSUP (NAVSUP, 2016l).

NEXCOM oversees six major programs:

- Navy Exchange (NEX) Retail Stores and Services
- Ships Stores Program
- Uniform Program Management Office
- Navy Clothing and Textile Research Facility (NCTRF)
- Navy Lodge Program
- Telecommunications Program Office (NAVSUP, 2016l)

NEXCOM executes non-appropriated funds in support of its operations, the only exception being the Ship's Store Program. As a result, NEXCOM is a self-sustaining organization and reinvests all profits from sales into Morale, Welfare, and Recreation (MWR) programs and NEX retail operations and equipment (NAVSUP, 2016l).

Unlike civilian retail operations, the House Armed Services Total Force Subcommittee exercises congressional oversight over NEXCOM. Specialized laws “govern how military exchanges may operate in certain businesses or with certain types of merchandise” (NAVSUP, 2016). Regulation of alcohol and tobacco prices and a ban on the sale of adult periodicals are a few illustrations of congressional mandates in effect.

G. REASON FOR SELECTING SPAWAR AND NAVSUP

We selected SPAWAR and NAVSUP for our research project because they are major SYSCOMs with large procurement organizations that procure simple goods and services in addition to complex systems. SPAWAR executes a significant number of tradeoff type contracts, while NAVSUP commonly uses the LPTA source selection strategy due to their service-centric mission at the regional, fleet, and squadron support level. Between the two organizations’ multiple contracting source selections, we were able to source a sufficient combination of LPTA and tradeoff source selection strategies to address our research questions.

H. SUMMARY

Chapter III provided a synopsis of DOD acquisition infrastructure, primarily focusing upon the Navy’s acquisition activities and organization. It also included an overview of two major SYSCOMs, SPAWAR and NAVSUP; particularly their mission, organizational structure, and contracting divisions. Chapter IV will describe how we obtained the research data, the statistical analysis conducted on the data, the analysis findings, and the implications of the findings.

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IV. DATA ANALYSIS

Chapter IV conveys the research process and the data analysis employed in response to our research questions. This research is part of an ongoing research stream. Therefore, much of the language and techniques used to analyze the data are largely the same as previous research projects in order to maintain the integrity and consistency of the primary research body. The research stream also includes the works of Watson (2015), Lamoureux, Murrow, and Walls (2015), Bastola, Woodward, and Findley (2015), and Ban, Barnes, and Comer (2015). That said, all data used for this analysis is unique and was acquired from SPAWAR and NAVSUP; commands not previously used in this research stream.

A. VARIABLES EXAMINED

Our analysis contains two main dependent (outcome) variables (DVs) from the data collection categories detailed in the Appendix: PALT and CPARS ratings. PALT corresponds to the amount of time, in days, from the receipt of an approved requirements package to the date when the resulting contract is awarded. This DV is considered continuous for our analysis. CPARS ratings can be used as an indicator of positive or negative contract performance. These ratings are typically assigned periodically and at the conclusion of contract performance. To assess contract performance, contractors are rated on the following variables: Cost, Quality, Schedule, Business Relationship, and Subcontracting. Likert categorization has been assigned for CPARS ratings. Therefore:

- 5=Excellent
- 4=Very Good
- 3=Satisfactory
- 2=Marginal
- 1=Unsatisfactory

In this research, we used an overall average of CPARS ratings as the second DV (i.e., we combined individual CPARS ratings to make an average CPARS rating for each contract).

In this analysis, the DV or outcome may vary from the influence of a single independent variable (IV): source selection strategy. More specifically, the IV refers to the LPTA and tradeoff source selection strategies. We designated the IV as LPTATO, where a 0 represents LPTA and a 1 represents tradeoff.

This data analysis uses five covariate variables from the data collection categories listed in the Appendix. These five items can potentially influence the association between the IV and DV. The five covariates used in this data analysis are continuous variables and are as follows: (1) value of the contract in dollars (VALUE), (2) number of evaluation factors (NUMEVALFACTORS), (3) number of reviews (NUMREVIEWS), (4) number of offers (NUMOFFERS), and (5) number of contract line item numbers (NUMCLINS). It is our wish to parcel out any covariate effects so that the true relationship between the IV and DVs become more visible.

B. DESCRIPTIVE STATISTICS

Table 1 displays the descriptive statistics that resulted from our analysis and breaks down each variable into data subcategories. The subcategories are sum of all data (top), sum of LPTA data (middle), and sum of tradeoff data (bottom).

Table 1. Descriptive Statistics

Descriptive Statistics						
Variable		Obs	Mean	Standard Deviation	Min	Max
PALT (days)	Sum of all Data	29	245.8966	237.60220	14	990
	Sum of LPTA	18	126.1111	81.24682	14	370
	Sum of Tradeoff	11	441.9091	280.64440	84	990
Average CPARS Rating	Sum of all Data	19	3.528070	0.6784617	2.2	5
	Sum of LPTA	5	3.600000	0.5477226	3.0	4
	Sum of Tradeoff	6	3.325000	0.9293815	2.2	5
Value	Sum of all Data	43	\$18,700,000.00	\$22,500,000.00	\$27,819.07	\$92,600,000.00
	Sum of LPTA	18	\$1,368,585.00	\$1,380,352.00	\$27,819.07	\$4,499,432.00
	Sum of Tradeoff	13	\$30,200,000.00	\$28,000,000.00	\$99,999.43	\$92,600,000.00
Number of Evaluation Factors	Sum of all Data	30	2.633333	1.0662000	1	5
	Sum of LPTA	17	2.058824	0.6586528	1	3
	Sum of Tradeoff	13	3.384615	1.0439080	2	5
Number of Reviews	Sum of all Data	30	7.366667	7.049007	2	25
	Sum of LPTA	18	4.444444	5.260533	2	25
	Sum of Tradeoff	12	11.750000	7.300374	2	24
Number of Offers	Sum of all Data	42	3.404762	3.298629	1	12
	Sum of LPTA	18	3.833333	4.514682	1	12
	Sum of Tradeoff	13	3.692308	2.056883	1	8
Number of CLINs	Sum of all Data	31	17.35484	51.52834	1	290
	Sum of LPTA	18	22.00000	67.09782	2	290
	Sum of Tradeoff	13	10.92308	13.51827	1	47

C. DATA CONCERNS

The data extracted from contracts that used the LPTA source selection strategy consist of 18 PALT and five CPARS ratings. Likewise, for those using the tradeoff source selection strategy, 11 PALT and six CPARS ratings were extracted. Power calculations ($\alpha = .05$, $\beta = .80$) suggest we need five PALT cases and 41 CPARS cases to achieve adequate statistical power. In this case, the required amount of PALT cases was collected. However, we were unable to collect enough CPARS cases to achieve adequate statistical power. The latter point should be kept in mind when interpreting the results.¹ There is also a small disproportionality in the data pertaining to the amount of cases for the strategies examined. The assignment of sum squares can become problematic when there is uncertainty about the mean in this unbalanced design. Regardless of these concerns, solutions exist. Instead of utilizing a grand mean,² we can apply a weighted

¹ A total of 65 cases (i.e., contract files) were collected; however, not all cases had sufficient data to be included in the analysis.

² In a balanced design, the grand mean acts as an intercept.

mean. In addition, the Stata 12.1 statistics software used for our analysis performs assignment of sums of squares.

D. RESEARCH PROCESS

Our focus is to investigate variations among contract outcomes based on source selection strategy. In accordance with statistical practice, a methodology based on group differences is required. Therefore, source selection strategies (LPTA and tradeoff) must be divided into respective groups in an effort to determine if contract outcomes (PALT and CPARS ratings) differ between the groups.

Our plan originally was to use multivariate analysis of covariance (MANCOVA) to evaluate the group differences. MANCOVA evaluates “statistical differences on multiple continuous dependent variables by an independent grouping variable, while controlling for a third variable called the covariate” (Statistics Solutions, n.d.). The data, however, failed to meet the assumptions required for MANCOVA (specifically, they failed the linearity assumption between the DVs), so we were forced to examine the DVs separately, using analysis of covariance (ANCOVA), which is a univariate method.

The ensuing issues are addressed by ANCOVA: After considering covariate effects, what is the likelihood that mean differences among the groups on a given DV occurred by chance? Once the effect(s) of the covariates (VALUE, NUMEVALFACTORS, NUMREVIEWS, NUMOFFERS, and NUMCLINS) have been parceled out, is there a significant difference between the PALT mean value in procurements that use LPTA as opposed to the PALT mean value in procurements that use tradeoff? Similarly, is there a significant difference between the mean value of CPARS ratings in procurements that uses LPTA as opposed to the mean value for CPARS ratings in procurements that use tradeoff once the effect of the covariates have been removed?

E. ASSUMPTION TESTING

We tested some assumptions about the data prior to performing the ANCOVA. The tests were as follows:

First, Mahalanobis' Distance and scatter plots were used to find outliers. We found five outliers and chose to drop those observations from subsequent analyses, as outliers are known to significantly affect ANCOVA (Tabachnick & Fidell, 2007, pp. 200–203).

Second, normality of the sampling distribution was evaluated by examining density graphs to assess skewness and kurtosis. While normality is assumed in situations “with relatively equal sample sizes in groups, no outliers, and two-tailed tests ... [and] 20 degrees of freedom for error” (Tabachnick & Fidell, 2007, p. 202), we do not meet the degrees of freedom criterion with our CPARS data. The density graphs indicated that the dependent variables were not normally distributed. To achieve a normal distribution, the dependent variables and covariates were logarithmically transformed.

Third, linearity was evaluated by studying 40 different scatter plots. The variables used in the scatter plots included all pairs of covariates and all pairs of DV-covariate combinations for each source selection strategy. The scatter plot analyses indicated that many of the DV-covariate relationships were non-linear. We chose to drop those covariates because “[c]ovariates are often included as a convenience in reducing error, but it is hardly a convenience if it [sic] reduces power” (Tabachnick & Fidell, 2007, p. 251). After dropping the troublesome covariates, the remaining covariates are NUMREVIEWS and NUMOFFERS for the PALT DV, and VALUE and NUMEVALFACTORS for the CPARS DV.

Fourth, analysis of variance (ANOVA) was used to examine regression homogeneity. These ANOVAs consist of the IV, each of the covariates, and an interaction term between the IV and each of the covariates. The interaction terms were not significant, which indicates that the relationship between the DVs (PALT or CPARS ratings) and their associated covariates is the same at both levels of the IV (LPTA or tradeoff). Therefore, the assumption of regression homogeneity is met.

Fifth, an assessment of multicollinearity was performed by evaluating the squared multiple correlation for each covariate. Multicollinearity is not an issue.

Sixth, homogeneity of covariance between groups was evaluated using the multivariate test of means provided in Stata 12.1 statistics software. This test checks whether population variances and the covariance of both DVs are equal for each of the IV groups. All grouping cells were homogenous.

Seventh, the reliability of the covariates was examined. Because all the covariates are factual calculations of actual contract data, we have no reason to suspect unreliability. With the data properly tested and prepared, the ANCOVAs were performed.

F. RESULTS

1. PALT

The results suggest that source selection strategy, with PALT as the DV, yields substantial variations in time-to-contract, even after adjusting for the covariates (NUMREVIEWS and NUMOFFERS) ($F(3,25) = 7.13, p < .01$). Neither of the covariates is statistically significant. The strength of the relationship was moderate, with $\eta^2 = .22$. The results indicate that tradeoff source selections take 105% longer than LPTA source selections ($b_3 = 1.05, p < .01$). This result supports the anecdotal evidence that tradeoff source selections take more time than LPTA source selections. Table 2 and Table 3 represent the results of ANCOVA and regression analysis, respectively, for the PALT DV.

Table 2. PALT ANCOVA Output

Number of Observations = 29

Root MSE = 0.722369

R-squared = 0.4610

Adj. R-squared = 0.3963

Source	Partial Sum of Squares	Degrees of Freedom	Mean Square	F-Distribution	Prob > F
Model	11.1559193	3	3.71863977	7.13	0.0013
Innumreviews	0.483079791	1	0.483079791	0.93	0.3452
Innumoffers	0.013554514	1	0.013554514	0.03	0.8733
LPTATO1	5.24428376	1	5.24428376	10.05	0.004
Residual	13.0454237	25	0.52181695		
Total	24.2013431	28	0.86433368		

Table 3. PALT Regression Output

Number of Observations = 29

F(3,25) = 7.13

Prob > F = 0.0013

R-squared = 0.4610

Adj. R-squared = 0.3963

Root MSE = 0.72237

Source	Sum of Squares	Degrees of Freedom	Mean Square
Model	11.1559193	3	3.71863977
Residual	13.0454237	25	0.52181695
Total	24.2013431	28	0.86433368

Inpaltreq	Coefficient	Standard Error	t	P > t	95% Confidence Interval	
Innumreviews	0.1880682	0.1954632	0.96	0.345	-0.2144958	0.5906321
Innumoffers	0.0274795	0.1705006	0.16	0.873	-0.323673	0.378632
LPTATO1	1.052352	0.3319532	3.17	0.004	0.3686812	1.736022
_cons	4.385241	0.2934172	14.95	0	3.780936	4.989545

2. CPARS Ratings

The results suggest that source selection strategy, with CPARS ratings as the DV and VALUE and NUMEVALFACTORS as the covariates, does not yield substantially dissimilar CPARS ratings, ($F(3,6) = 0.43$, ns). Neither of the covariates is statistically significant. It is important to note the small sample size for this ANCOVA (required $n = 41$). With only 10 observations, there is not enough power to detect statistical significance. More data are required to confirm these results. Table 4 and Table 5 represent the results of ANCOVA and regression analysis, respectively, for the CPARS DV.

Table 4. CPARS ANCOVA Output

Number of Observations = 10

Root MSE = 0.253161

R-squared = 0.1768

Adj. R-squared = -0.2348

Source	Partial Sum of Squares	Degrees of Freedom	Mean Square	F-Distribution	Prob > F
Model	0.082590764	3	0.027530255	0.43	0.7394
Invalue	0.031062576	1	0.031062576	0.48	0.5124
numevalfact	0.007897081	1	0.007897081	0.12	0.7376
LPTATO1	0.065499193	1	0.065499193	1.02	0.3511
Residual	0.384543186	6	0.064090531		
Total	0.46713395	9	0.051903772		

Table 5. CPARS Regression Output

Number of Observations = 10

F(3,6) = 0.43

Prob > F = 0.7394

R-squared = 0.1768

Adj. R-squared = -0.2348

Root MSE = 0.25316

Source	Sum of Squares	Degrees of Freedom	Mean Square
Model	0.082590764	3	0.027530255
Residual	0.384543186	6	0.064090531
Total	0.46713395	9	0.051903772

InCPARS	Coefficient	Standard Error	t	P > t	95% Confidence Interval	
Invalue	0.0339787	0.0488073	0.7	0.512	-0.0854484	0.1534057
numevalfact	-0.036401	0.1036997	-0.35	0.738	-0.2901451	0.217343
LPTATO1	-0.1726467	0.1707801	-1.01	0.351	-0.5905305	0.2452371
_cons	0.9175872	0.6970996	1.32	0.236	-0.7881542	2.623329

3. Kruskal-Wallis H Test

Finally, because the CPARS variable was measured using Likert scores and some contend that Likert scores are ordinal rather than interval, we performed the Kruskal-Wallis H test. It is a “rank-based nonparametric test that can be used to determine if there are statistically significant differences between two or more groups of an independent variable on a continuous or ordinal dependent variable” (Laerd Statistics, 2013). Examining CPARS ratings as an ordinal variable, the results show no difference in CPARS ratings based on source selection method ($\chi^2(1) = .533, p = .47$), which confirms the results we found in the ANCOVA; however, this test also suffers from lack of statistical power. The box plot in Figure 12 displays these results.

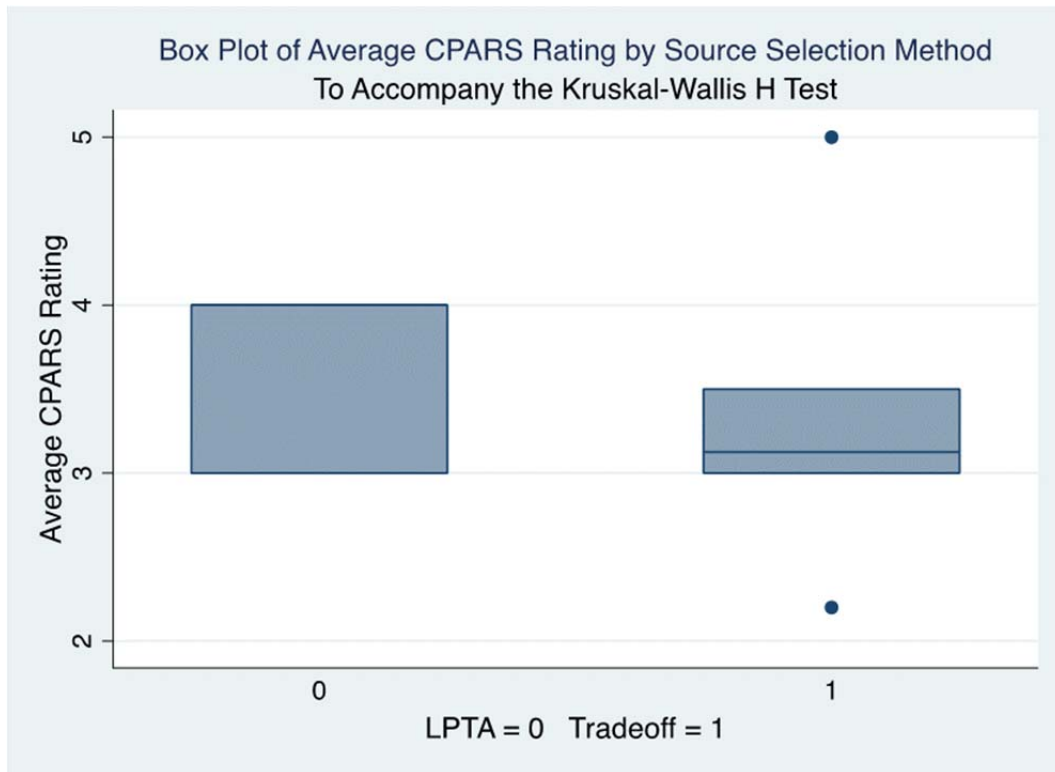


Figure 12. Box Plot of Average CPARS Rating by Source Selection Method

G. SUMMARY

Chapter IV described the results of the statistical analysis performed using the data from SPAWAR and NAVSUP. It provided a synopsis of the variables examined, a brief overview of the descriptive statistics utilized, identified data concerns, discussed the methodology used, and provided outcomes of the data analysis. Chapter V provides an overview of our analysis, the conclusions that were reached, and additional research topics to be examined in future studies.

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V. SUMMARY, CONCLUSIONS, AND AREAS FOR FURTHER RESEARCH

A. SUMMARY

The goal of federal contracting is to obtain best value in all procurements, especially given the constrained budgetary environment. The contract management process provides the framework for achieving best value for the government and the taxpayer. The six steps of the contract management process are comprised of procurement planning, solicitation planning, solicitation, source selection, contract administration, and contract closeout. The source selection strategy is identified in the solicitation planning step and is executed in the source selection step of the process. Contracting professionals use either the LPTA or the tradeoff source selection strategy to achieve best value. However, there is a debate as to when the use of an LPTA or tradeoff source selection strategy is appropriate. Much of the debate concerns the potential relationship between contract outcomes and the strategy utilized. Relying on anecdotal evidence, many believe that LPTA source selections typically result in lower quality supplies and services and incentivize contractors to submit proposals below their actual costs in order to earn the contract award and then increase total contract cost/price through post-award modifications. Conversely, anecdotal evidence suggests tradeoff source selections take more time to award (PALT) than LPTA source selections because of the (typically) more extensive evaluation of non-cost/price factors. Moreover, anecdotal evidence suggests that tradeoff source selections result in a greater contract cost/price and have a higher risk of protest. To test these anecdotes, this research sought evidence of a statistical relationship between source selection strategy and contract outcomes, to include PALT and CPARS ratings. Our team extracted data from contracts at SPAWAR HQ, SSCPAC, and NAVSUP FLC San Diego to support this ongoing research stream. Various statistical models were used to determine if answers exist to the following research questions:

- (1) Are pre-award contract elements affected by source selection strategy? Pre-award elements include amendments to solicitation, how long it takes

to award the contract (PALT), contract type, and whether there was a protest.

- (2) Are post-award contract elements affected by source selection strategy? Post-award elements include CPARS ratings, and, if applicable, EVM metrics.
- (3) Are there any patterns or trends based on federal supply codes when LPTA or tradeoff is used as a source selection strategy at different systems commands?

B. CONCLUSIONS

Based on the results of our statistical analysis, the answers to our research questions are as follows:

- (1) Are pre-award contract elements affected by source selection strategy? Pre-award elements include amendments to solicitation, how long it takes to award the contract (PALT), contract type, and whether there was a protest.

The results suggest that there is a statistically significant relationship between source selection strategy and PALT. More specifically, contracts awarded using the tradeoff source selection strategy took, on average, 105% longer to award than contracts awarded via the LPTA strategy. There was not sufficient data to support a statistically significant relationship between source selection strategy and the number of amendments to a solicitation. Similarly, there was not enough data to conclude that a statistically significant relationship exists between source selection strategy and the likelihood of a protest taking place. We arrived at the same conclusion regarding the relationship to contract type.

- (2) Are post-award contract elements affected by source selection strategy? Post-award elements include CPARS ratings, and, if applicable, EVM metrics.

The results indicate that there is not enough data to confirm if a statistically significant relationship exists between source selection strategy and CPARS ratings. For contracts reviewed that used the LPTA source selection strategy, five sets of CPARS ratings were extracted. Likewise, for the contracts that used the tradeoff source selection strategy, seven sets of CPARS ratings were extracted. Power calculations suggest we

need 41 CPARS cases to achieve adequate statistical power. As a result, we were unable to collect enough CPARS cases to determine if a statistically significant relationship exists. Similarly, a statistically significant relationship could not be determined between source selection strategy and EVM metrics due to a lack of available data.

- (3) Are there any patterns or trends based on federal supply codes when LPTA or tradeoff is used as a source selection strategy at different systems commands?

Statistical analysis indicates that there is not enough data to confirm if a significant relationship exists between source selection strategy and federal supply codes at different systems commands. More data are required to complete this analysis.

C. AREAS FOR FUTURE ANALYSIS

Based on our results, the following areas were identified for future analysis. These areas are based on data gaps, which may provide additional insight into the relationship between source selection strategy and contract outcomes.

1. EVM and CPARS Data

Previous iterations of this research stream have been unable to accumulate sufficient EVM and CPARS data to determine if a statistically significant relationship exists between source selection strategy and contract outcomes. During our research, we were only able to collect 10 CPARS data observations, and we did not reach the 41 observations required to provide adequate statistical power. During the initial coordination with the supporting commands, greater emphasis should be made in selecting contracts with associated CPARS information. Similarly, we were unable to find any EVM data within the contract files reviewed at SPAWAR and NAVSUP. Future research teams should access major weapon system contract data that includes EVM data and analyze accordingly. As more empirical data are obtained, additional analysis can be conducted to see if the relationships between source selection strategy and contract outcomes differ for various types of requirements (aircraft, ships, submarines, space assets, etc.).

2. Effect of New DOD Source Selection Procedures

The latest DOD Source Selection Procedures (DFARS PGI 215.3, dated March 31, 2016) incorporates the most recent best practices identified in pre-award peer reviews and program manager focus group reviews (DOD, 2016, p. 1). One area for further research is to ascertain if implementation of the new DOD Source Selection Procedures affects future source selection strategy determination. Research teams should collect post-implementation source selection trend data to assess the document's impact on the relationship between source selection strategy and contract outcomes. Statistical analysis should be conducted to compare pre- and post-implementation data to identify any significant trends and the implications thereof.

APPENDIX. DATA COLLECTION CATEGORIES

Data Collection Catagories						
Basic Info	Acquisition Complexity					
Observation #	Predominant Contract Type	# Evaluation Factors	Eval Factor #4	Life Cycle Stage	# Competitive Range	Incentive Fee Criterion #5
Service	SB Set Aside	Eval Factor #1	# Subfactors in EF#4	Joint Urgent Operational Need (JUON)	Single or Multiple Award	Award Fee Criterion #1
Organization	Consolidated Requirement	# Subfactors in EF#1	Eval Factor #5	# CLINs	On-Ramp Provision	Award Fee Criterion #2
Contract Number	Multiyear	Eval Factor #2	# Subfactors in EF#5	Pre-Solicitation Conference/ Industry Day	Incentive Fee Criterion #1	Award Fee Criterion #3
Name	# Years	#Subfactors in EF#2	# Subelements	Pre-Proposal Conference	Incentive Fee Criterion #2	Award Fee Criterion #4
NAICS	Dollar Value	Eval Factor #3	ACAT/SCAT Level	Pre-Award/Pre-Performance Conference	Incentive Fee Criterion #3	Award Fee Criterion #5
PSC	Trade Off or LPTA	# Subfactors in EF#3	FAR Part	# Offerors	Incentive Fee Criterion #4	

Data Collection Categories						
Environmental Factor		Outcome Variables				Other
# Reviews	# Team Locations	PALT - Requirement Receipt Date	Protest	EVM CV	RFP Amendment Reason 2	# Evaluation Notices
Review 1 Date	ACE Support	PALT - RFP Issue Date	Protest Level	EVM SV	RFP Amendment Reason 3	# ENs Pre-Competitive Range
Review 2 Date	MIRT Support	PALT - Proposals Received Date	Protest Results	EVM CPI	RFP Amendment Reason 4	# ENs Post-Competitive Range
Review 3 Date	Use of Collaboration Tools	PALT - Contract Award Date	Corrective Action (Describe)	EVM SPI	RFP Amendment Reason 5	# Rounds of ENs
Review 4 Date	Abundance/ Lack of File Documentation Rating	PALT - Days	CPAR Cost	Nunn-McCurdy Breach	RFP Amendment Reason 6	# Clarification Requests
# Personnel on Source Selection Team	State of the Economy	Early Strategy and Issues Session (ESIS) Date (>\$100M)	CPAR Quality	# of RFP Amendments	Earned Award Fee %	# Deficiency Reports
		ASP Date	CPAR Business Relationship	RFP Amendment Reason 1	Earned Incentive Amount/ Available	Basis for Award

Source: Bastola, Findley, & Woodward (2015).

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